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**PARIS-JOURDAN SCIENCES ÉCONOMIQUES**

48, Bd JOURDAN – E.N.S. – 75014 PARIS  
TÉL. : 33(0) 1 43 13 63 00 – FAX : 33 (0) 1 43 13 63 10  
[www.pse.ens.fr](http://www.pse.ens.fr)

# **Working in family firms: less paid but more secure?\***

## **Evidence from French matched employer-employee data**

Andrea Bassanini  
(OECD, ERMES-University Paris II and IZA)

Thomas Breda  
(ENS and Paris School of Economics)

Eve Caroli  
(University Paris Ouest-EconomiX and Paris School of Economics)

Antoine Rebérioux  
(University Paris Ouest-EconomiX)

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## **Abstract**

We study the compensation package offered by family firms. Using matched employer-employee data for a sample of French establishments in the 2000s, we first show that family firms pay on average lower wages to their workers. This family/non-family wage gap is robust to controlling for several establishment and individual characteristics and does not appear to be due either to the differential of productivity between family and non-family firms or to unobserved establishment and individual heterogeneity. Moreover, it is relatively homogeneous across workers with different gender, educational attainment and age. By contrast, the family/non-family wage gap is found to be larger for clerks and blue-collar workers than for managers, supervisors and technicians, for whom we find no significant wage gap.

As a second step, we investigate why workers stay in family firms while being paid less. We show that these firms offer greater job security. We find evidence that the rate of dismissal is lower in family than in non-family firms. We also show that family firms rely less on dismissals and more on hiring reductions when they downsize. These results are confirmed by subjective data: the perceived risk of dismissal is significantly lower in family firms than in non-family ones. We speculate that our results can be explained either by a compensating wage differential story or by a model in which workers sort in different firms according to their preferences.

## **Résumé**

Nous étudions les systèmes de rémunérations en vigueur dans les entreprises familiales. Sur la base de données employeurs-salariés appariées portant sur un échantillon d'établissements français dans les années 2000, nous montrons dans un premier temps que les entreprises familiales versent des salaires plus faibles que les entreprises non familiales. Cet écart de salaires est robuste à l'introduction d'une série de contrôles portant sur les caractéristiques des établissements et des salariés. De plus, il n'apparaît pas dû à l'écart de productivité existant entre entreprises familiales et non familiales, ni à une éventuelle hétérogénéité inobservée entre établissements ou salariés. Par ailleurs, l'écart de salaires entre entreprises familiales et non familiales est relativement homogène entre hommes et femmes et entre salariés ayant des niveaux d'éducation différents. En revanche, il est plus important pour les CSP inférieures (ouvriers et employés) que pour les CSP supérieures (techniciens, contremaîtres et cadres) pour lesquelles il n'est par ailleurs pas significatif.

Dans un second temps, nous nous interrogeons sur les raisons pour lesquelles les salariés restent dans les entreprises familiales si les salaires y sont plus faibles. Nous montrons que la sécurité de l'emploi y est plus élevée. Le taux de licenciement apparaît ainsi plus faible dans les entreprises familiales que dans les non familiales. Nous montrons également que les entreprises familiales ont moins recours aux licenciements et plus aux réductions d'emploi quand elles font face à un choc négatif sur leur niveau d'emploi. Ces résultats sont confirmés par ceux que l'on obtient sur données subjectives : le risque de licenciement perçu par les salariés est plus faible dans les entreprises familiales que dans les non familiales. Nous conjecturons que nos résultats sont compatibles avec deux types d'explications : un modèle de différences compensatrices de salaires et un modèle dans lequel les salariés s'auto-sélectionnent dans les entreprises familiales ou non sur la base de leurs préférences.

## Introduction

Family firms have attracted much interest both in the recent economics and finance literature. Most studies have focused on their performance (see Bertrand and Schoar, 2006). In particular, they have tried to assess whether family firms are efficient<sup>1</sup> – in which case the value of the firm is maximised for all shareholders – or whether they give rise to private benefits of control – in which case the value is maximised for family shareholders only, at the expense of minority shareholders (see e.g. Villalonga and Amit, 2010). The main issue in this literature is therefore how profits are divided among shareholders.

A much less researched issue is how value-added is shared between shareholders and the other main category of stakeholders, namely employees. The existing literature focuses almost exclusively on CEOs and top managers and most papers suggest that they get paid less in family firms than in non family ones – see Gomez-Mejia et al (2003), Bach and Serrano-Velarde (2009) and Bandiera et al (2010). In contrast, the compensation of non-managerial workers has been largely neglected.

In this paper, we focus on all categories of employees. We first investigate whether family firms pay on average lower wages. We find that this is actually the case and that the family/non-family wage gap is larger for workers in lower-skilled occupations. We then consider the reasons why wages would be lower in family-owned companies. We show that these firms offer a specific compensation package in which lower wages are associated with greater job security. This suggests that workers may be indifferent between working in family or non-family firms or, alternatively, that workers with high risk aversion self-select into family-owned companies.

We build a unique dataset by matching individual and establishment-level data on firm ownership, company accounts, establishment characteristics, worker flows and employees' social security records including wages. Looking at evidence on family firms in France is interesting since they account for a large share of national employment. Our main dataset contains a cross-section of 2,650 establishments in 2004 – of which a vast majority are not listed on the stock market. We also have longitudinal information on a subset of establishments. Using these data, we estimate Mincerian wage equations augmented by family ownership. Controlling for standard workers' and establishments' characteristics as well as the presence of union representative,<sup>2</sup> we find that net hourly wages are about 3% lower in family firms than in non-family companies.

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<sup>1</sup> The empirical evidence on this point is far from being clear cut. Some papers find that family firms out-perform (Anderson and Reeb, 2003; Villalonga and Amit, 2006; Sraer and Thesmar, 2007; Fahlentach, 2009), which suggests that they are more efficient than non-family firms. In contrast, other studies provide evidence that family firms under-perform (Claessens et al, 2000; Morck et al, 2000; Cronqvist and Nilsson, 2003) in particular when control is passed on to the descendants (Perez-Gonzalez, 2006; Bennedsen et al, 2007; Villalonga and Amit, 2010).

<sup>2</sup> Mueller and Philippon (2010) show that French family firms are less unionised than non-family ones. To the extent that unions succeed in bargaining for higher wages, this may be one obvious determinant of lower wages in family firms. This is why we control for the presence of union representative in our estimates.

The literature suggests several reasons for this family wage penalty. In a seminal paper on managerial practices in developed countries, Bloom and Van Reenen (2007) show that family firms are less innovative and therefore less productive than non-family firms. This could be a reason why wages are lower in family firms. We show that in our sample family firms are indeed less innovative, but that this does not account for the entire family/non-family wage gap: controlling for the use of information and communication technologies (ICT), innovative managerial practices and/or for firm level productivity, we still find a wage penalty in family firms close to 3%.

The literature on CEO compensation also suggests that compensation should be lower in family firms, at least for top managers. Agency theory indeed states that executive compensation is designed to align the interests of managers with those of shareholders (Murphy, 1999). As underlined by Jensen and Meckling (1976) the risk of misalignment is larger for firms with dispersed ownership because it is more difficult for shareholders to control managers' actions. In contrast, managers have less discretion as to the actions they take when there are large blockholders. So, in equilibrium, managers' compensation (including wages, premiums and bonuses) should be lower in family firms, where control is tighter. To the extent that managers are more directly monitored by firm owners than workers in lower skilled occupations (who tend to be monitored by managers), agency problems arising from the ownership status of the firm are likely to be stronger for managers than at lower layers in the hierarchy. A related prediction is that, if agency problems have any role in explaining the family wage penalty, the latter should be larger for managers than for workers in lower-skilled occupations. The literature on entrenched managers, or the “skimming view” of CEO compensation (Gabaix and Landier, 2008), provides similar predictions: CEOs with more discretion will pay themselves higher wages, as they are able to extract private rent (Bertrand and Mullainathan, 2001; Bebchuk and Fried, 2004). They will also pay higher wages to their managerial co-workers in order to enjoy a more pleasant working environment (Cronqvist et al, 2009). In sum, entrenchment should benefit managerial co-workers much more than any category of employees.

In contrast, we find that the family/non-family wage<sup>3</sup> gap appears to be, if anything, larger for low-skilled workers (namely blue-collars and clerks) than for high-skilled ones (technicians, supervisors and managers) even controlling for establishment fixed-effects: the estimated gap for workers in low-skilled occupations is about 4% larger than for workers in high-skilled occupations. This suggests that agency problems are not likely to be the main determinant of the family wage penalty that we observe. In addition, we find that, after controlling for unobserved heterogeneity across establishments, the family/non-family wage gap is relatively homogeneous across other dimensions of worker heterogeneity: the difference in wages across family and non-family firms is about the same for men and women, for

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<sup>3</sup> In our data, “wages” include basic wages and fixed and performance-related premiums and bonuses.

workers with different educational levels and, once ICT intensity is controlled for, for young and older workers.

Our results raise a major issue: why should workers continue to work in family firms if paid less? The literature in finance suggests that families may have longer time horizons than non-family shareholders so that they are more likely to grasp long-term profitable investment opportunities (Anderson and Reeb, 2003). To the extent that long-term employment relations allow building valuable specific human capital within firms, family ownership is expected to be positively associated with job security (Stavrou et al., 2006). We test this assumption in three different ways. Using quarterly data on hirings and separations over 2000-2007, we first show that the rate of dismissal is lower in family than in non-family firms, with the gap being as large as 15%, even when controlling for employment growth at the establishment level. We also investigate whether family firms rely less on dismissals than non-family firms when they downsize, and find that this is actually the case. This is a key point from the point of view of incumbent workers: if employed in a family firm, they face a lower risk of job loss when the firm is hit by a negative shock and has to destroy jobs. When this occurs, family firms appear to reduce hirings more and increase dismissals less than non-family firms, in order to accommodate the required staffing changes. These results are confirmed by subjective data: the perceived risk of dismissal is significantly lower in family firms than in non-family ones. Interestingly, the gap in perceived job security across family and non-family firms is particularly large for workers in unskilled occupations. This parallels the fact that the family wage penalty is larger for lower-skilled workers. Overall, our results on subjective and objective job security suggest that family firms do actually offer a specific compensation package with lower wages but greater job security.

Our paper is one of the very few investigating non-CEO pay in family firms. The only other paper we are aware of is Sraer and Thesmar (2007). On a repeated cross-section of French listed firms over 1994-2000, they estimate firm-level wage equations. Controlling for the workforce's occupational structure, they find a wage penalty of about 4.5% in family firms run by heir CEOs as compared to widely-held companies. Our paper shows that a similar family/non-family wage gap is also found in non-listed companies and that it is essentially borne by lower-skilled workers. Focusing on non-listed firms is a key point since they typically represent a very large share of employment. Moreover it allows us to have greater over-time variation in ownership status in our sample: listed companies are often large holdings which rarely change ownership status whereas individual, non-listed firms may be sold by one holding to another one, leading to a larger amount of ownership changes between family and non-family holders. This allows us to improve on Sraer and Thesmar (2007) on a second dimension, namely the control for heterogeneity across establishments. Exploiting the panel dimension of our data, we show that changes in ownership

status from family to non-family are associated with a substantial increase in wages and that firms which become non-family were not already paying higher wages.

Our paper also contributes to a second strand of literature which focuses on job security in family firms. The key point in this literature is that family firms, being more long-term oriented than non-family ones, they can more credibly commit to implicit contracts thereby providing employment insurance to their employees. So far, most papers have tackled this issue only indirectly. Stavrou et al (2006) and Block (2010) investigate the relationship between family-business status and downsizing. Both papers find that family ownership is associated with smaller employment reductions conditional to downsizing. The problem in interpreting these results is that a given amount of job destruction can result either from workers' voluntary quits or from dismissals and that only dismissals affect job security of incumbent workers. Sraer and Thesmar (2007) study the covariation of firm employment changes and industry-level shocks. They find that employment growth at the firm level is less sensitive to industry level shocks in family firms than in non-family ones. However, this result does not provide an unambiguous proof that workers' job security is greater in family firms insofar as the literature on job and worker flows (e.g. Davis et al., 1997, 2006) shows that idiosyncratic shocks at the establishment level are far more important than industry shocks in determining establishment-level employment adjustment. We improve on these papers by directly focusing on the risk of job loss for incumbent workers. As far as we know, our paper is the first one to show that family firms display lower rates of dismissals even when controlling for employment destruction. This is not compensated by higher rates of other involuntary types of separations, suggesting that workers in family firms do face a lower risk of job loss. We also show that incumbents are more protected in family firms because these firms rely more on hiring reductions and less on dismissals than non-family firms when contracting employment. Consistently with this evidence, we show that workers in family firms perceive a lower risk of job loss. This set of results, we argue, provides direct evidence of greater job security in family firms.

The layout of the rest of the paper is as follows. Section 1 presents the empirical strategy. Section 2 describes the dataset and presents summary statistics. Section 3 reports results on the relation between family ownership, wages and job security. Section 4 concludes.

## 1. The empirical specification

### 1.1 The wage equations

In the first part of this article, we estimate the relationship between family ownership and wages. In order to do that we start from a standard Mincer equation (see Mincer, 1974):

$$\log w_i = Z_i b + r s_i + \delta x_i + \gamma x_i^2 + u_i \quad (1)$$



where  $w_i$  denotes individual earnings,  $s_i$  a measure of schooling,  $x_i$  an experience measure,  $Z_i$  a set of other variables assumed to affect earnings and  $u_i$  a standard error term.

In our setting, one of the key determinants of individual wages is the type of ownership of the firm where the individual is employed. So, we extend equation (1) in order to introduce family ownership as an explanatory variable. We then rewrite it as:

$$\log w_{ij} = \gamma F_j + X_i \alpha + X_j \beta + \varepsilon_{ij} \quad (2)$$

where  $w_{ij}$  is the net hourly wage of worker  $i$  employed in establishment  $j$  as of year 2004,  $F_j$  is a dummy variable equal to 1 if the firm to which the establishment belongs is family-owned and 0 otherwise,  $X_i$  is a vector of individual characteristics including schooling and experience (as proxied by the introduction of age and tenure). We also control for a set of establishment and firm-level variables ( $X_j$ ) including industry and regional dummies. Finally,  $\varepsilon_{ij}$  is a standard error term.

Given that individual wage information is only available for a small number of workers in each establishment<sup>4</sup>, we also estimate wage equations at the establishment level:

$$\log w_j = \gamma F_j + X_j \beta + \varepsilon_j \quad (3)$$

where  $w_j$  is the average hourly wage at the establishment level in 2004.<sup>5</sup>

One issue with our estimates is that they might be driven by unobserved heterogeneity across establishments. In order to control for heterogeneity in time-invariant characteristics, we re-estimate equation (3) in long differences:

$$\Delta \log w_j = \gamma \Delta F_j + \Delta X_j \beta + \eta_j \quad (4)$$

where  $\Delta \log w_j$  denotes the change in the average gross annual wage at the firm level between 1998 and 2004.<sup>6</sup>  $\Delta F_j$  is the change in ownership over the period (namely family ownership in 2004 minus family ownership in 1998) and  $\Delta X_j$  is a set of time-varying establishment controls.<sup>7</sup>

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<sup>4</sup> On average we have individual information on a subsample of about four workers per establishment, even if establishments in our dataset employ at least twenty employees (see Section 2).

<sup>5</sup> Computed using all employees in the establishment.

<sup>6</sup> We do not have establishment-level data on wages for 1998 (see Section 2. for more details on the data).

<sup>7</sup> Other robustness checks concerning unobserved heterogeneity are described in Section 3.

One of the issues that we address in this paper is whether the wage gap that may exist between family and non-family firms is homogenous across workers. In order to test for this, we augment equation (2) by introducing interaction terms between workers' characteristics and family ownership:

$$\log w_{ij} = \gamma F_j + X_i \alpha + X_i F_j \delta + X_j \beta + \varepsilon_{ij} \quad (5)$$

In order to better control for unobserved heterogeneity across establishments, some specifications of equation (5) include establishment fixed effects. The wage equation then writes:

$$\log w_{ij} = X_i \alpha + X_i F_j \delta + \mu_j + \varepsilon_{ij} \quad (6)$$

## 1.2 Job security

Once we have assessed the relationship between family ownership and wages, we investigate whether family firms offer a specific compensation package including more job security. In order to do so, we first estimate the relationship between family ownership and different types of separation rates. In our data, separation rates are available for each quarter over 2000-2007 whereas family ownership, establishment and firm-level controls are available only for the year 2004. Some types of separations, including dismissals, fluctuate quite a lot over time. Therefore, we estimate them over a rather long time period (2000-2007). The model that we estimate is thus:

$$S_{jt}^a = \gamma F_j + X_j \beta + D_t + \varepsilon_{jt} \quad (7)$$

where  $S_{jt}^a$  is the separation rate of type  $a$  (dismissal, voluntary quit, retirement, end of trial period and end of fixed-term contract), in establishment  $j$  at time  $t$ ,  $F_j$  is our dummy variable indicating family ownership,  $X_j$  is a vector of establishment and firm-level controls and  $D_t$  is a time dummy.<sup>8</sup> As we try to establish some statements concerning job security, our main interest is on dismissal rates. Nevertheless, it is important to look also at other types of separations in order to make sure that a low level of one type of separation is not compensated for by a high level of another type.

A particularly important issue for the job security of an incumbent worker is the behaviour of her employer when a negative shock forces it to destroy jobs. In such a case, there is clearly a greater risk that her position be suppressed independently of the effort she pays in her job. We estimate, therefore, whether, when family firms are hit by a bad shock and downsize, they rely more or less on dismissals

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<sup>8</sup> We also conduct robustness checks on a shorter time period (2004-2007). Overall, for each type of separation, estimating equation (7) is equivalent to regressing its average rate over the period on our cross-sectional variables. However, given that there are many missing values concerning separation rates, we prefer a specification such as equation (7) that includes time dummies. This allows us to minimise the risk of bias due to the fact that missing values could be correlated with the business cycle. In order to take into account the fact that our family variable does not vary over time, the standard errors are clustered at the firm level.

than non-family firms do under the same circumstances. We do so by looking at the sensitivity of establishment-level dismissals to establishment-level job creation and destruction and testing whether this sensitivity differs between family and non-family firms. However, other establishment-level characteristics are likely to affect this sensitivity (notably establishment age) and we need to control for them in our estimates. Therefore we estimate the following model:

$$DR_{jt} = \alpha_{1j}JCR_{jt} + \alpha_{2j}JDR_{jt} + D_t + \mu_j + \varepsilon_{jt} \quad (8)$$

where  $DR_{jt}$  is the dismissal rate,  $JCR_{jt}$  (resp.  $JDR_{jt}$ ) is the job creation (resp. destruction) rate and  $\mu_j$  is an establishment fixed effect, which allows us to take into account that dismissal rates are persistently different across establishments. The coefficients of  $JCR_{jt}$  (resp.  $JDR_{jt}$ ) are assumed to vary across different establishments according to the following model:

$$\begin{aligned} \alpha_{1j} &= \alpha_1 + \gamma_1 F_j + X_j \beta_1 \\ \alpha_{2j} &= \alpha_2 + \gamma_2 F_j + X_j \beta_2 \end{aligned} \quad (9)$$

Plugging equation (9) into equation (10) yields the final regression that we estimate:

$$DR_{jt} = \alpha_1 JCR_{jt} + \alpha_2 JDR_{jt} + \gamma_1 F_j JCR_{jt} + \gamma_2 F_j JDR_{jt} + X_j JCR_{jt} \beta_1 + X_j JDR_{jt} \beta_2 + D_t + \mu_j + \varepsilon_{jt} \quad (10)$$

A negative coefficient on the  $JDR_{jt} F_j$  interaction term would suggest that family firms rely less on dismissals when they downsize. However, when firms are hit by a negative shock and have to downsize, the frontier between dismissals and quits may be somewhat blurred, insofar as firms may put pressure on workers so that they quit, either directly or by cutting their wage and worsening their working conditions. As a consequence, we also want to check that the estimated pattern for dismissals is not compensated by an opposite one for quits. We therefore re-estimate the same model of equation (10) using alternatively total separations, quits and hirings as dependent variable and check whether, when family firms are hit by a bad shock and downsize, they rely less on separations than non-family firms and make the necessary adjustment by compressing hirings.

Finally, another key aspect of job security as part of a compensation package is whether workers in family firms effectively feel that they have a smaller risk of losing their job. Therefore, we estimate the relationship between family ownership and the risk of dismissal perceived by workers in 2004. The basic specification is equivalent to equation (2):

$$RD_{ij} = \gamma F_j + X_i \alpha + X_j \beta + \varepsilon_{ij} \quad (11)$$

where  $RD_{ij}$  is the risk of dismissal perceived by worker  $i$  employed in establishment  $j$ .

## 2. The data

The data we use come from several databases as it is necessary to combine information on wages, firm ownership, worker flows, employees' characteristics, as well as a wide array of firms' and/or establishments' characteristics.

The first data source that we use is a linked employer-employee dataset for France: the REPONSE 2004 survey (RElations PrOfessionnelles et NégociationS d'Entreprise) which was conducted in 1992, 1998 and 2004. To our knowledge, it is one of the very few databases that include information both on ownership status of listed and non-listed companies and on workers' characteristics. In 2004, a representative sample of 2,930 establishments with at least 20 employees were surveyed. Questions about firm ownership, the use of information and communication technologies (ICT) and innovative managerial practices, as well as establishment and workforce characteristics were asked to one senior manager per firm. After cleaning out establishments with average hourly wages above 100€<sup>9</sup> as well as charities, associations and governmental organisations operating in the business sector, which are likely to have very specific wage policies, we end up with 2,650 establishments.<sup>10</sup>

Regarding firm ownership, the manager is asked: "What is the type of the main category of shareholder of the firm?" According to the answer, we group firms into two main categories: those with family ownership (the main shareholder is a family or an individual) and those with non-family ownership (i.e. for which ownership is either dispersed or private equity or which are joint-ventures). We define a *family* variable which takes value 1 if the firm is owned by a family or an individual and 0 otherwise. However, some firms do not belong to any of the above two categories: they are either worker-owned or State-owned or they belong to other types of shareholders<sup>11</sup>. We define three dummy variables corresponding to these types of ownership and we control for them in our regressions. With this definition of ownership, the proportion of establishments belonging to a family firm in our sample is 56.1% (see Appendix Table A1) – and family firms account for 58% of the total number of firms. Dispersed ownership, private equity and joint ventures represent only 30.1% of the establishments. The remaining 14% of the establishments are either worker-owned (3.2%), State-owned (2.7%) or have other shareholders (7.8%). This proportion of family firms is very close to what is found for France in the literature. Bloom and Van Reenen (2007) define family firms as firms whose largest shareholder is either the founder or family members who are second generation or beyond. On a sample of listed and non-listed companies, they find a proportion of family firms in France very close to ours (56%), out of which 26% are founder-owned and 30% are owned by second generation (or beyond) family members. Similarly, on a very large sample of French listed and non listed companies, Bloch and Kremp (2001) also observe that 56% of the firms are family

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<sup>9</sup> Wage data comes from social security records (see below in the text).

<sup>10</sup> Belonging to 2,231 different companies.

<sup>11</sup> Essentially mutual companies.

controlled. Sraer and Thesmar (2007) use a slightly different definition of family firms: a firm is family-owned if the family or a member has more than 20% of the voting rights. Given that they only consider French listed companies whereas our survey contains both listed and non-listed firms, the intersection between our and their dataset is obviously small. Nonetheless 65 firms are common to both datasets and for 54 of those firms (i.e. 82%), the answer about ownership is identical in both datasets.

The manager survey in REPONSE also provides information on the use of information and communication technologies (ICT) and innovative managerial practices. Managers are asked what proportion of the employees use computers, the Internet or the Intranet. For each of these new technologies, the answer is coded from 0 to 4 with 0 corresponding to "nobody", 1 to "less than 5%", 2 to "5-19%", 3 to "20 to 49%" and 4 to "50% and more". Our ICT variable is defined as the sum of the answers over the three types of technologies. It thus captures the intensity of use of ICT at the establishment level and varies between 0 and 12. We standardise it to 0 mean and 1 standard deviation. As regards innovative managerial practices, we build a summary index along the lines suggested by Bloom and Van Reenen (2007). In the REPONSE survey we have information on the proportion of workers involved in performance dialogue (expression groups, shopfloor meetings, quality circles), the number of devices designed to stimulate workers' participation (firm project, seminars, firm newspaper, open day, suggestion box, satisfaction survey), whether workers are autonomous in handling tasks and whether their work is defined in terms of goal to reach rather than in terms of precise actions. Managers are also asked the number of areas in which quantitative targets exist (financial return, budget, cost, quality, growth, security), whether there exist a training scheme, individual or collective premiums or stock options (both for managers and non-managers), individual appraisals and whether employees' assessment has any impact on wages or promotions. We build one variable out of the answer given for each item – see the Data Appendix for more details. Our summary index is then defined as the weighted sum of each of these variables so that they equally contribute to the overall index<sup>12</sup>. One interesting point is that family firms appear to be much less innovative than non-family ones both in terms of ICT use (the ICT index is -0.21 for family firms as compared to 0.24 for non family ones) and in terms of managerial practices (the index is respectively -0.25 and 0.33 for family and non-family firms).

Finally, the REPONSE manager dataset provides information on establishment size, age and the presence of a union representative in the establishment. The REPONSE survey has also been matched with social security records (the Déclarations Annuelles des Données Sociales, DADS)<sup>13</sup> so that, at the establishment level, we have information on the average net hourly wage<sup>14</sup> as well as the structure of the workforce (by age, gender and occupations), including workers on fixed-term contracts but excluding workers provided

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<sup>12</sup> Here again, we standardise the index to 0 mean and 1 standard deviation.

<sup>13</sup> The match has been done by the DARES (Direction de l'animation de la recherche et des études statistiques), namely the statistical office of the Ministry of Labour, before they gave us access to the data.

<sup>14</sup> Net hourly wages from the DADS include basic wages, premiums and bonuses.

by temporary help service (THS) firms. As can be seen from Appendix Table A1, family firms are, on average smaller than non-family ones. Their establishments are a little bit older and the proportion of workers in highly skilled occupations (managers and supervisors and technicians) is much lower than in non-family businesses.

In our sample, family firms have also more workers on fixed-term contract (5.3% against 3.4% in non-family ones).<sup>15</sup> Moreover, the proportion of establishments with a union representative is much lower in family firms (24.3%) than in non family ones (52.2%). Finally, the average net hourly wage is 11.2€ in the whole sample; it is lower in family (10.1€) than in non-family firms (12.6€).

The establishment-level variables described so far are used as controls in both our individual-level and establishment-level wage regressions (see eqs (2) and (3) above).

Information about individual workers is also provided by the REPONSE survey. In 2004, for each establishment, 4 workers were interviewed, on average. They were randomly drawn out of the group of workers with more than 15 months of tenure. After cleaning out CEOs and workers with extreme ages and wages<sup>16</sup>, the worker database contains 6,945 employees from 2,412 establishments. They have been asked questions about their individual characteristics (age, education, tenure, gender, whether they work part-time or full-time) as well as the risk they perceive of loosing their job in the next 12 months. Using this information, we build a variable capturing the perceived risk of dismissal which takes values 1 to 4 when the risk is perceived as being respectively "zero", "low", "high" and "very high". Thanks to the match with the DADS, for each worker who has been interviewed, we also have information on her wage, occupation, and hours worked. Such a design generates linked employer-employee information, which allows us to study individual compensation taking into account both firm and worker heterogeneity on observable characteristics. As evidenced in Appendix Table A2, we have 37.3% of women in our sample and this proportion is slightly larger in family firms. The proportion of highly educated workers (with some college degree and above) is lower in family firms (23.6 %) than in non family ones (34 %), while the proportion of workers in low-skilled occupations is higher: 62.7 % of the family-firm workers are blue-collars and clerks as compared to only 44.1 % in non-family firms. The share of full-timers is lower in family firms and, on average, workers are slightly younger and have lower tenure. As was the case for average wages at the establishment level, individual wages appear to be lower in family firms than in non-family ones, just like the perceived risk of dismissal.

The REPONSE survey has a panel subsample which provides information on establishments in 1998 and 2004 by means of the manager questionnaire. It contains 622 establishments belonging to 596 firms for

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<sup>15</sup> This suggests that firms in our sample have a smaller share of temporary workers than the French average (which in 2004 was about 10% for workers on fixed-term contracts, excluding THS workers, see OECD, 2008).

<sup>16</sup> We exclude from the sample employees with wages in the top and bottom 1% of the distribution as well as employees aged less than 20 years and more than 60 years.

which we have data on ownership at both dates. We use it to control for heterogeneity on unobservable establishment characteristics. Table A3 presents firm-level descriptive statistics for 1998:<sup>17</sup> 58.9% of firms are family-owned while dispersed ownership, private equity and joint ventures represent 30.2% of the firms. These figures are very similar to those obtained for 2004 (see Appendix Table A1). Changes in family ownership are captured through a variable defined as family ownership in 2004 minus family ownership in 1998. This variable may thus take values 0 (no change in ownership), +1 (family-owned in 2004 while it was not in 1998) and -1 (family-owned in 1998 while not anymore in 2004). On average, it is equal to -0.001 in our sample. By contrast, the proportion of firms changing ownership whatever the direction is much higher: 20.1% over the period.

The REPONSE panel does not contain information on establishment-level wages in 1998. We use the DIANE dataset to overcome this problem. DIANE is a database which contains publicly-available company accounts<sup>18</sup> and has information on the annual wage bill per employee at the firm level (which we use as a proxy of gross annual wages) as well as firm-level labour productivity (defined as valued added per worker), firm size and age in 1998 and 2004. Appendix Table A3 provides statistics for these variables in 1998. Using various years of DIANE as well as other sources (such as the Internet, the press, etc.), we construct a variable indicating whether the firm is listed or not at the end of the period. As shown in Table A1, only 1.9% of the firms in our sample are listed on the stock market in 2004.

The last source that we use is the DMMO/ EMMO database. The DMMO (Données sur les Mouvements de Main-d'Oeuvre) has exhaustive data on gross worker flows (hirings and separations, excluding THS workers) for establishments with 50 employees or more for each quarter. The data is broken down by type of flow. The EMMO (Enquête sur les Mouvements de Main-d'Oeuvre) has identical information on a representative sample of establishments with less than 50 employees. We match the DMMO and EMMO datasets with REPONSE 2004. The match of the two datasets is rather good: after doing it, we obtain 2298 matched establishments, of which 2199 report information on ownership. We use the DMMO-EMMO data to compute indicators of job security and, more specifically, of hiring and separation rates at the establishment level. In order to do that, we drop all movements corresponding to job spells shorter than one month. These indeed correspond to very short trial periods or temporary contracts which have little to do with job security for core workers<sup>19</sup>. We also exclude movements due to transfers between two establishments of the same firm. Our data allows us to build hiring and separation rates for each quarter

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<sup>17</sup> We provide descriptive statistics at the firm rather than establishment level because the information from the REPONSE panel is used at the firm level in the next section. The reason is that we have wage information only at the firm (rather than the establishment) level in 1998.

<sup>18</sup> It is provided by Bureau van Dijk, a private consulting company, and it is the French source file for the more famous Amadeus database.

<sup>19</sup> Our results are nonetheless robust to the inclusion of these very short job spells.

over 2000-2007.<sup>20</sup> As standard in the gross worker flow literature (Davis et al, 2006), the hiring rate is defined as the ratio of all hires during a given quarter to the average employment level of that quarter<sup>21</sup> and the separation rates as the sum of all types of separations<sup>22</sup> divided by average employment. In order to go deeper into the types of separations, we define dismissal rates, quit rates, retirement rates, rates of end of trial periods and rates of end of fixed-term contracts as the ratio of the corresponding type of movement during the quarter to the average employment of the quarter. Following the gross job flow literature (Davis et al., 1997), we also define the job creation rate as the net growth rate of employment in the establishment between the beginning and the end of the quarter when it is positive<sup>23</sup>. Symmetrically, the job destruction rate is the absolute value of the net growth rate of employment when it is negative<sup>24</sup>. Appendix Table A4 presents descriptive statistics of worker and job flows.

Each quarter, the establishments in our sample hire about 5.6% of their workers for more than one month and separate from about 5.2% of them. This results in a 0.4% employment growth per quarter due to a 2.7% job creation rate and a 2.3% job destruction rate. However, establishments of family firms appear to have grown at a more rapid pace in the period of observation than their non-family counterparts (with 2.9% job creation and 2% job destruction rates, against 2.2% and 2.9%, respectively). This difference is reflected in much greater hiring by family firms (6.2% of their workforce is hired in each quarter, compared to 4.8% for non-family firms) and slightly lower separations (5.3% in family firms against 5.5% in non-family firms). Each quarter, family firms dismiss fewer workers (0.5% on average, compared to 0.65% in non-family firms) and have lower separations due to retirement or end of trial period (0.1% and 0.2%, respectively, against 0.2% and 0.3% in non-family firms), but more workers quit voluntarily (1.6% compared to 1.4% in non family firms) or separate at the end of a fixed-term contract (2.4%, compared to 2% in non family firms).

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<sup>20</sup> Potentially we have information for 32 quarters for each establishment. However, there are several missing values and we have complete information for only 523 establishments. The average number of quarters with non-missing data per establishment is 23.7. We have non-missing data in at least half of the quarters in 1848 establishments, while we have less than one fourth of the quarters for 178 establishments.

<sup>21</sup> The average employment level of the quarter is defined as half of the sum of the employment levels at the beginning and the end of the quarter (see e.g. Davis et al., 2006).

<sup>22</sup> In the original data, separations are classified as due to dismissals, quits, retirement and early retirement, end of trial periods, end of fixed-term contracts or other temporary contracts, military service, injuries, death or separations for unknown reason.

<sup>23</sup> Job creation rate:  $JCR = \max(0, \Delta E / \bar{E})$  where  $E$  is the level of employment in the establishment, and  $\bar{E}$  is its average.

<sup>24</sup> Job destruction rate:  $JDR = \max(0, -\Delta E / \bar{E})$ .



### 3. Results

#### 3.1 Wages in family firms

##### *3.1.a Family firms pay lower wages*

Average hourly wages, measured at the establishment level, are lower in family than in non-family firms (see Table 1. Panel A). The simple bivariate correlation between family ownership and wages – see column (1) – indicates that wages are 23.8% lower in family firms than in non family ones. Not surprisingly, the family wage penalty is smaller when we include 2-digit industry dummies and other establishment controls – establishment size and age, presence of a union representative, being listed or not, 10 regional dummies and ownership by workers, government or other shareholders<sup>25</sup>. The point estimate is further reduced when controlling for 4-digit industry dummies and workforce characteristics (i.e. occupational structure, proportion of women and proportion of workers below 40 years). When including all controls, the wage gap between family and non-family firms amounts to about 2.8%. In all cases, it is significant at the 1% level. The fact that family firms still come out as paying lower wages when controlling for 4-digit industry dummies, the occupational structure and the presence of union representatives suggests that the wage gap is not due to the fact that family businesses are overrepresented in specific industries, employ a larger share of unskilled workers and are less unionised – see Sraer and Thesmar (2007), Mueller and Philippon (2010) and Appendix Table A1.

Individual wage equations yield the same result with wages being lower in family firms (see Table 1, Panel B). In this specification, we control for establishment characteristics, 2 or 4-digit industry dummies and for workers' individual characteristics (10 age classes, 4 job-tenure classes, gender, 8 educational-attainment classes and a dummy for part-time work). When including all controls, the estimated wage gap is 4.1%. It is higher than when using establishment-level data because in this specification we control for workers' education rather than occupations. The reason why we do this is that occupations are likely to be much more endogenous to firms' human resource management practices than education. The latter is indeed measured at the end of schooling (i.e. at the beginning of the career) whereas the former is the outcome of the career workers have made so far. As a matter of fact, the probability of being employed in higher occupations (i.e. as a manager or technician or supervisor) is lower in family firms, even after controlling for workers' and establishments' characteristics, including 4-digit industry dummies: we estimate the marginal probability of being in an higher occupation to be 5.8% lower in family firms, with standard error equal to 2.3%.<sup>26</sup> This suggests that family businesses offer fewer career prospects conditional on the observable characteristics of workers. One consequence of this is that controlling for occupations rather than education in our wage equations is not neutral. We do not have information on the

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<sup>25</sup> All results in the paper are robust to excluding these firms from the sample.

<sup>26</sup> Full regression results available from authors upon request.

average educational level of the workforce at the establishment level. This is why we use the occupational structure as a control in Table 1 – Panel A. As a robustness check, Appendix Table A5 reports the results of the individual wage regression including occupational rather than educational controls.

The wage gap between family and non-family firms could be due to the fact that family firms are less innovative – and hence less productive – than non-family ones. Evidence of such difference in innovativeness is provided by Bloom and Van Reenen (2007). We find similar evidence in our data (see Table 2). When workforce characteristics, 4-digit industry dummies and other establishment controls are included in the specification, family-owned establishments have on average lower indicators of ICT use and innovative managerial practices than establishments whose ownership is mainly widely held, private equity or joint ventures. As a consequence family firms are less productive, and the productivity gap becomes insignificant when we control for ICT and management practices – see Appendix Table A6 – col (4).<sup>27</sup> When controlling for ICT use and managerial practices in the establishment-level wage regression, the coefficient on family firms decreases only slightly (see Table 3, Panel A): the wage gap between family and non family firms is still 2.6% (as compared to 2.8% when technology and managerial practices are not controlled for). The result we obtain at the individual level is very similar (see Table 3, Panel B) with a 2.9% wage gap.<sup>28</sup> Column 2 of Table 3 shows that the same holds when controlling for firm-level labour productivity: the wage gap at the establishment (resp. individual) level is 2.2% (resp. 2.7%). So, the family wage gap we observe both at establishment and individual level is not entirely due to the fact that family firms are less productive: the largest part of the gap remains unexplained after controlling for this variable. The same holds for ICT and innovative managerial practices: their introduction does not wipe out the negative correlation between family ownership and wages.

### 3.1.b Selection issues

Our results could be driven by heterogeneity across firms on unobservable characteristics. Table 4 uses the REPONSE panel to overcome this problem. However, let us underline that, as mentioned in the data section, for the year 1998 we only have firm (and not establishment) level pay. Moreover our proxy for pay is the gross annual wage – defined at the firm level – instead of the net *hourly* wage which we have used in the wage regressions so far. So, we first compute the firm-level average gross annual wage<sup>29</sup> for 2004 in order to get a consistent measure of the variation of this variable in the panel. We then estimate

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<sup>27</sup> The fact that ICT and managerial practices are important determinants of firm productivity is well established in the literature (see for example, Black and Lynch, 2001).

<sup>28</sup> Note that the main effect of the inclusion of ICT use and management practices in the family wage equation is that there is almost no difference in the family wage penalty between using occupations and using educational attainment as controls - see Table A5 – col (4) and Table 3, Panel B – col (1). This suggests that, despite the fact that occupations are more endogenous than education, controlling for one or the other variable does not make much of a difference in our analysis.

<sup>29</sup> As mentioned in section 2, this is defined as the ratio of the gross annual wage bill at the firm level to the number of employees.

first-difference equations in which we regress changes in the average gross annual wage at the firm level between 1998 and 2004 on the change in ownership over the period (namely family ownership in 2004 minus family ownership in 1998). We include time-varying controls such as: change in firm size, change in the share of women, change in the occupational structure, change in the presence of union representative, change in log labour productivity<sup>30</sup> and other changes in ownership<sup>31</sup>. Our results show that when family firms change to non-family ownership (i.e.  $\Delta\text{Family}$  is negative), their wages grow and this pay increase is significant at the 1% level. This suggests that the estimated family wage gap we observe in Tables 1 and 3 is not entirely due to unobserved firm heterogeneity.

Our result, nevertheless, could also arise if firms changing ownership status from family to non-family were already paying higher wages. To take this possibility into account, we also include a control for the log of the average gross annual wage in 1998 in our first-difference regressions – see column (4) of Table 4. The estimate of the family wage gap is not affected, which suggests that this potential problem is not biasing our estimates. However, in panels with a short time dimension, the estimate of the coefficient of a lagged dependent variable in levels is likely to be biased (e.g. Nickell, 1981). For this reason, in Table 5 we also check directly whether firms which switched from family to non-family ownership between 1998 and 2004 had larger wages in 1998. The number of firms in the panel being quite small (about 500) we only control for 2-digit industry dummies on top of 1998 establishments' and workers' characteristics – see Appendix Table A3. The first column shows that in 1998, like in 2004, the correlation between family ownership and wages at the firm level is negative and significant (with an estimated gap in annual gross wages as large as 11.1%). The same holds when controlling for firm-level productivity (see col (3)): the gross wage appears to be 5.2% lower, on average, in family firms. These point estimates are not directly comparable to those in Tables 1 and 3 (concerning 2004 net hourly wages) because our variable here is the gross annual wage.<sup>32</sup> The key result in Table 5 is that switching from family to non-family ownership over the period is not significantly correlated to the level of wages before the change in the main shareholder: the "change to non-family" variable is never significant whether or not we control for productivity (resp. cols (2) and (4)). In other words, firms which became non family between 1998 and 2004 did not have higher wages before changing ownership.

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<sup>30</sup> Given that results in Table 3 suggest that, as far as the estimation of the family wage gap is concerned, controlling for the log productivity or for ICT use and management practices essentially captures the same economic phenomenon, we prefer to use log productivity since we can consistently measure it at the firm level.

<sup>31</sup> Other changes in ownership include becoming worker-owned (or government-owned or owned by another type of shareholder) between 1998 and 2004 or stopping being owned by this type of shareholder over the period.

<sup>32</sup> Re-running our estimates for the average gross annual wage in 2004 with 2-digit dummies, we find that the correlation between family ownership and wages is smaller in 2004 as compared to 1998 (-6.9% as compared to -11.1%) - Appendix Table A7 – col (1). However, this difference is essentially due to greater heterogeneity in productivity levels in 1998 than in 2004: when controlling for productivity, both coefficients become much closer: -4.8% in 2004 as compared to -5.2% in 1998 - see Appendix Table A7 – col (2) and Table 5 – col (3).

One could still argue, however, that family firms that are going to be sold out and become widely-held are already on an upward wage-growth trend (selection on trends rather than on levels). We deal with this problem in two ways. First, we estimate a specification including the lagged change in log wages (between 1992 and 1998) in the last column of Table 4. Reassuringly, including this term does not change the estimate of the parameter of interest. Second, in an unreported regression, we look at the correlation between the lagged change in log wages (1992-1998) and subsequent changes in ownership from family to non-family (1998-2004). If family firms that were about to be sold out and become widely-held were already on an upward wage-growth trend, one would expect a positive correlation between these two variables. The correlation is instead negative, albeit not significant at conventional levels (the point estimate is 0.172 with standard error 0.123).

Finally, given that family firms tend to be less productive, another type of selectivity bias could arise if the family firms paying high wages were eventually driven out of the market. In that case, the negative correlation we observe between family ownership and wages would result from the fact that family firms only survive if they succeed in keeping labour costs as low as possible. If such a dynamic effect is at play, it is presumably stronger in more competitive environments where firm turnover<sup>33</sup> is greater. Results in Table 6 show that this is not the case. We split the sample between establishments located in industries with firm turnover above and below the median of all industries. Using average net hourly wages at the establishment level – Panel A –, the estimated relationship between family ownership and wages is negative in both cases but the point estimate is weak and insignificant in high-turnover industries whereas it is larger and more significant in less competitive industries. This result suggests that selection due to the potentially greater death hazards of high-paying family firms is not likely to be driving our results. An even clearer picture emerges when using individual wage data – see Table 6 – Panel B: the relationship between family ownership and wages is weak and insignificant in high-turnover industries, whereas it is stronger and significant, at conventional levels, in low-turnover industries.

Another possible problem is the selection of workers on unobservable characteristics. Individual unobserved characteristics are important determinants of individual wages. Indeed, Abowd et al. (1999b) find, on the basis of French matched employer-employee longitudinal data, that individuals with unobserved, time-invariant high-wage characteristics – not accounted for by gender, education, experience and job tenure – tend to sort into firms when they are hit by a good productivity shock. However, in the same paper, Abowd et al. also show that other types of shocks (such as profit shocks) do not induce any sorting process. Moreover, in their data, the unobserved, time-invariant individual and firm components of wages are almost uncorrelated. Overall this suggests that, at least in our panel

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<sup>33</sup> Firm turnover is defined as the sum of the employment weighted rates of entry and exit of firms in each industry in 1996. Rates are computed by dividing this sum by total industry employment, using the OECD Firm-level Database, which provides information on entry and exit at the 2-digit industry level. The median industry is rubber and plastic manufacturing with firm turnover as high as 7%.

regressions of Table 4, when we control for changes in firm-level productivity, firm fixed-effects and observable changes in workforce characteristics, the remaining worker heterogeneity should not bias our estimate of the effect of family ownership, a firm level variable, on log wages.

Overall, the fact that family firms do pay lower wages is robust to a variety of controls and, in particular, it does not appear to be due to selection effects.

### *3.1.c Heterogeneity in the family wage gap across workers*

Following the agency and managerial entrenchment theories, the family wage penalty should be larger for managers than for workers in lower skilled occupations. More generally, this suggests that the family/non-family wage gap may be different across categories of workers. In this section, we consider potential heterogeneity across workers along four dimensions: education, gender, age and occupation and we show that the family wage penalty is homogenous across workers in most but not all dimensions.

In Table 7 – Panel A, we consider potential heterogeneity across education and gender. In order to do that, we interact family ownership with both dimensions. Columns (1) and (3) include a full set of establishment and worker controls, together with 4-digit industry dummies and controls for ICT use and innovative managerial practices. In columns (2) and (4) we re-estimate the model with establishment fixed-effects in order to better control for unobserved heterogeneity across plants. Results in column (1) suggest that low-education workers earn less in family firms than in non-family ones, while it is not the case for highly educated workers<sup>34</sup>. However, the difference between the estimates for both groups is not significant (-1.3% with standard error 1.8%). In order to better control for establishment unobserved heterogeneity, we run a fixed effect estimate - see column (2). This confirms that the high-low education wage gap is not significantly higher in family firms as compared to non family ones<sup>35</sup>. Regarding gender, women (but not men) seem to earn less in family firms – col (3) – but, here again, the difference between the estimates for both groups is not significant at conventional levels (-2.4% with standard error 1.8%). This is robust to controlling for unobserved heterogeneity across establishments – col (4). So, our results suggest that the family wage gap is not significantly different across educational levels and gender. Low (resp. high) education workers and women (resp. men) are not particularly penalised in family firms.

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<sup>34</sup> The coefficient on the Family\*Group-type variable gives the wage gap for workers in this group type between family and non family firms. For example, the coefficient on the Family\*(High school diploma and above) variable gives the wage gap for highly educated workers between family and non family firms.

<sup>35</sup> The coefficient on the Family\*(Group A – Group B) variable gives the wage gap between group-A and group-B workers in family firms as compared to non-family ones. For example, the coefficient on the Family\*(Below High school – High school or above) variable gives the wage gap between low and highly educated workers in family firms as compared to non-family ones.

Table 7 – Panel B is similar in structure to Panel A but focuses on the family wage gap across age groups. As a first step, we consider workers below and above 40 years old, which is the median age in our sample. The results in column (1) correspond to the specification without establishment fixed effects. Workers above 40 years old appear to earn less in family firms than in non family ones, whereas it is not significantly the case for younger workers. In this case, the difference across age classes is significant at conventional levels and it is robust to the introduction of establishment fixed effects – see col (2). We find in fact that senior workers earn significantly less with respect to younger ones in family firms as compared to non family ones.

A first explanation for this could be that job tenure is more rewarded in non-family than in family firms, insofar as senior workers have on average greater job tenure than younger ones. Column (3) of Panel B shows that the age-tenure correlation is unlikely to account for the wage penalty we find for senior workers in family firms: when controlling for the interaction between family ownership and tenure, we still find that wages grow substantially less as age increases in family firms with respect to non family ones.

Another reason for this difference in the wage age gap may be that family firms are less intensive in ICT and use fewer innovative managerial practices than non-family firms. There is evidence in the literature that ICT and innovative managerial practices are age-biased (see Aubert et al, 2006). If this is the case, it may generate two different mechanisms affecting senior workers' pay in family/non-family firms. First, there may be a direct wage effect: to the extent that senior workers are less efficient in innovative firms, they should be paid less (as compared to younger workers) in non-family businesses because the latter are on average more intensive in ICT and managerial practices. This does not quite fit with our results since we find that senior workers tend to earn more (rather than less) in relative terms in non-family firms. A second mechanism would involve a selection effect: if ICT-intensive firms shift their age structure towards younger workers, seniors are more strongly selected in those firms and they have on average better unobserved abilities. In this case, the predicted correlation would be that senior workers should earn more (with respect to younger workers) in non-family firms because the latter are more innovative and therefore select better senior workers. Results in column (4) of Table 7 – Panel B suggest that this is actually what occurs. When controlling for the interaction between family ownership on the one hand and ICT and innovative managerial practices on the other hand, we find that senior workers earn more as compared to younger ones in ICT-intensive firms, with managerial practices having no significant impact. Moreover, this effect wipes out the family/age wage gap: the point estimate on the family/age interaction goes down to virtually 0 and is not significant anymore.

One could wonder whether this pattern of results is robust to changes in the age threshold. What if we define younger workers as being aged less than 35 years or senior ones as being more than 45? Appendix

Table A8 shows that the results stay unchanged when moving the age limit to 35 years. In particular, the impact of controlling for ICT is the same as in the case of the 40-year threshold and, here again, the technological effect drives down to zero the family age gap. The same pattern is found when we increase the age threshold up to 45 years<sup>36</sup>. In contrast, estimates with establishment fixed effects are not significant anymore if we bring down the age limit at 30 years. Overall, these robustness checks suggest that the selection effect at work in ICT intensive firms starts at an early age, around 35 years, and is quite homogeneous above that limit. This is consistent with the findings of Aubert et al. (2006) who show that, in France, both the wage bill and employment shares of workers are positively correlated with establishment ICT intensity for workers aged from 30 to 39 years, whereas the opposite holds for older workers.

In Table 7 – Panel C, we investigate the potential heterogeneity of the family wage gap across occupations. Results in column (1) suggest that blue-collar workers and clerks earn less in family firms than in non-family ones. By contrast, we do not find any wage penalty for managers and technicians. This difference across occupations is significant at conventional levels and it is robust to including establishment fixed effects – col. (2): workers in lower occupations are paid less with respect to those in higher occupations when employed in family firms. As evidenced in column (3), this is the case both for blue-collars and for clerks, whose estimated coefficients are, moreover, not significantly different from one another. As regards managers, their coefficient do not differ more from that of technicians in family firms than in non-family ones. This is the reason why, in the remaining regressions, we group blue-collars and clerks together on the one hand and technicians, supervisors and managers together on the other hand. The family/non family wage gap for workers in lower occupations is robust to controlling for age. It could be the case that low-skilled workers are paid less in relative terms in family firms because they are on average older in these firms or because all workers are on average older in those firms. As evidenced in col (4), the family/low-occupation effect does not pick up this kind of effect. Workers in lower occupations are indeed more penalised when they are senior – the interaction between blue-collars and clerks and being above 40 years old is negative and significant – but this does not account for the fact that they are paid less with respect to workers in higher occupations in family firms. The point estimate on the family/low occupation interaction is even slightly higher when controlling for age and it remains significant at the 1% level. It is somewhat reduced when including interactions with ICT and managerial practices in order to take into account the fact that workers in lower occupations could be paid less in family firms because they are less innovative – see column (5). We do find such an effect - lower skilled workers tend to be paid more in ICT intensive firms – which suggests that the same selection effect is at work as with age. However, contrary to what we found for the family age wage gap, the introduction of ICT does not wipe out differences in the family wage gap across occupations: the interaction term

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<sup>36</sup> Unreported regressions. Results available upon request.

between lower occupations and family ownership is still -4% and it is significant at conventional levels. Eventually, we control for the fact that low-skilled workers could earn less in family firms because they are less unionised – see col (6). We do not find evidence of this: the point estimate on the union\*low-occupation term is not significant at conventional levels. In this specification, the family occupational gap is further reduced (down to 3.4% significant at the 10% level) but it does not disappear.

Overall, family firms appear to pay workers less. This is particularly the case for senior workers and workers in low-skilled occupations. Seniors earn less with respect to younger workers in family firms because of a selection effect: given that they are less intensive in ICT, family firms employ senior workers with relatively worse unobserved characteristics than in non-family firms. In contrast, the latter employ "good" seniors who are able to handle new technologies, consistently with the fact that non-family firms use them a lot. As regards workers in low occupations, ICT also generates a selection effect, but it does not account for the whole family occupational gap: in that case, blue-collars and clerks appear to earn less in family firms even when controlling for a wide array of possibly confounding factors.

### **3.2 Job security in family firms**

A question raised by our results on wages is: why should workers continue to work in family firms while being paid less? One possible explanation is that family firms offer something else on top of wages. It has been shown in the literature that in recent years, workers have been much concerned by job insecurity and, in particular, by the risk of job loss (see Valletta, 2000, for the USA, Nickell et al, 2002 for the UK, and Clark and Postel-Vinay, 2009, for France and other EU countries). In this section we investigate whether family firms offer greater job security than their non-family counterparts. If this were the case, it would suggest that family firms offer a different compensation package characterised by lower wages but greater job security.

A first way to look at job security in family firms is to consider separation rates and, more specifically, rates of dismissals which capture the risk of job loss for permanent workers. Panel A of Table 8 shows that dismissal rates are significantly lower in family firms even after controlling for our basic set of establishment and worker controls, including ICT and managerial practices, 4-digit industry dummies<sup>37</sup> and a full set of time dummies<sup>38</sup> – see col (1). The difference in dismissal rates between family and non-family firms is estimated to be as large as 0.1 percentage point per quarter, which appears significant from an economic point of view: the quarterly dismissal rate is in fact estimated to be 15% lower in family firms than in their non-family counterparts (cf. Table A4). This suggests that the risk of involuntary job loss is lower in family than in non-family firms. One interesting point is that the low level of dismissals is

<sup>37</sup> As discussed in Section 2, the DMMO-EMMO files do not report these firm characteristics, which are therefore drawn from the REPOSE survey and thus refer to 2004.

<sup>38</sup> One for each quarter over 2000-2007.



not compensated for by other types of separations – see cols (2) to (5): family firms do not display higher levels of quits, retirement, end of trial periods or end of fixed-term contracts.<sup>39</sup>

However, specifications in Panel A of Table 8 do not control for the proportion of permanent workers in the establishment. This may be a problem since external flexibility in family firms might be ensured by temporary contracts. As involuntary separations at the end of a temporary contract are not reported as dismissals in the data<sup>40</sup> this may create a bias in our estimates. In principle, given the small share of workers on temporary contracts in our sample, this should not be a major problem (see Table A1). Nevertheless, in order to deal with this problem, Table 8 – Panel B re-estimates the previous equations controlling for the proportion of permanent workers in the establishment in 2004, drawn from the REPOSE dataset.<sup>41</sup> The results are very similar to those in Panel A. Family firms still display lower rates of dismissals.<sup>42</sup> Given that our information on firm ownership is for year 2004, a further robustness check consists in reducing our sample to separations taking place in 2004 or later (see Table 8 – Panel C). Family firms still display lower dismissal rates, even though the coefficient on family ownership is less precisely estimated due to the reduction in sample size. Finally, it could be the case that family firms experience faster employment growth which would result in lower rates of dismissal. In our sample, employment growth is indeed faster in family firms with job creation being on average larger than job destruction whereas the opposite is true for non-family firms (cf. Table A4). In order to control for this possibly confounding factor, we re-estimate the relationship between family ownership and the different types of separations controlling for job creation and job destruction rates. As expected, the job destruction rate is strongly correlated to most types of separations (except the end of trial period) – see Panel D of Table 8 – but, most importantly for our purpose, the fact that family firms display a lower rate of dismissals is robust to this change in specification.

We also investigate whether family firms rely less on dismissals than non-family firms do when they downsize. This is indeed a crucial issue for incumbent workers: when a firm downsizes, they have a greater chance to lose their job independently of their effort. Do they face a lower risk of job loss when the firm is hit by a negative shock, if employed in a family firm? In order to shed light on this point, we regress dismissal rates on job creation and job destruction rates as well as their interaction with family ownership. As evidenced in Table 9 – Panel A, job destruction rates are strongly correlated with

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<sup>39</sup> Rates of separations due to quits and end of fixed-term contracts are estimated to be 6% higher in family firms with respect to non-family firms. Separations due to retirement and end of trial period are estimated to be 8% higher. However, none of these effects is statistically significant.

<sup>40</sup> They are simply classified as separations due to end of contract.

<sup>41</sup> Information on the share of workers on temporary contracts is neither available in the DMMO-EMMO nor in the DADS datasets. As a consequence, we do not dispose of a time series for this share.

<sup>42</sup> However, quit rates now appear to be 8% higher in family firms than in their non-family counterparts (and this difference is significant at the 10% level), which might suggest that family firms offer greater job security to their core workers while facing a substantial voluntary turnover of part of their workforce. Nevertheless, one needs to be cautious before drawing any conclusion on quits insofar as the coefficient of family firms in the quit regression is not uniformly significant across panels in Table 8.

dismissals, even controlling for establishment heterogeneity in separations through establishment fixed-effects – see col (1).<sup>43</sup> When comparing adjustment patterns in family and non family firms – see col (2) – family firms appear to rely less than non-family ones on dismissals when employment contracts: the coefficient on the interaction between family ownership and the job destruction rate is negative and significant. A consistent finding emerges when we use the hiring rate as dependent variable. Column 2 in Panel B of Table 9 shows a negative and significant coefficient on the interaction between family ownership and the job destruction rate even in this case. As a consequence, when facing a negative shock, family firms tend to achieve the required staff adjustment by reducing hirings more and by increasing dismissals less than non-family firms do.

One concern about these results is that establishments with different size, age etc., operating in different sectors or with different workers' characteristics could react in a different way to job creation or job destruction which could be confounded with the effect of family ownership. In order to control for this, cols (3) to (5) progressively include interaction terms between job creation and job destruction on the one hand and these potentially confounding factors on the other hand<sup>44</sup>. Our main result is robust to these changes: family firms consistently appear to rely less on dismissals and to compress more hirings when hit by a negative shock.

Obviously, insofar as net employment growth is equal to hires minus separations, the result on hirings implies that family firms rely less on total separations, in general, when they downsize. Indeed, the coefficients on the interaction terms in the hiring equations are identical to the corresponding ones that can be obtained using separation rates as dependent variable (see Table A9 – Panel A). Moreover, the fact that the coefficients in the dismissal and separation equations are almost identical suggests also that the difference in the sensitivity of separations to job destruction between family and non-family firms is almost completely accounted for by the dismissal restraint of family firms. As a further confirmation of this fact, we find that there are only small differences in the sensitivity of voluntary quits to downsizing between family and non-family firms (see Table A9 – Panel B). Moreover, they are insignificant when introducing our full set of controls.

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<sup>43</sup> As regards the adjustment to job creation, the positive coefficient on the JCR variable in some specifications of Table 9 and Table A9 might suggest that dismissals and separations increase with employment expansion – although this effect is substantially lower for family firms as indicated by the negative coefficients on the interaction between family ownership and job creation. This is consistent with previous evidence for France (see Abowd et al, 1999a). It is probably due to the fact that, when expanding, non-family firms make a lot of experimentation with new recruits which generates many hirings and separations of workers that stay with the firm only for a short period of time (see, Jovanovic, 1979 and Pries and Rogerson, 2005). As a matter of fact, Hall (2005) shows that, in the United States, a large fraction of separations is due to jobs lasting less than a day.

<sup>44</sup> Results in Table 9 were obtained controlling for the interaction of job creation and destruction rates and industry dummies at the 2-digit level only – rather than at the 4-digit level. This is done in order to reduce the number of interacted independent variables.

Overall, our results suggest that family firms do provide more job security to incumbent workers: not only do they have a lower dismissal rate, but when employment goes down, they also reduce hiring more than non-family firms do and consistently, they rely less on separations, in general, and dismissals, in particular. As a consequence, for a given (negative) change in employment, incumbent workers are more protected in family than in non-family firms.<sup>45</sup>

The fact that family firms offer greater job security is confirmed by subjective data. In Table 10, we use the information available in the employee section of the REPONSE survey on the risk perceived by workers of losing their job in the next 12 months<sup>46</sup>. More specifically, we regress the perceived risk of dismissal on family ownership using a specification identical to the one elicited for wages – see equations (2) and (11) in Section 1 above. As evidenced in col (1) of Panel A, workers in family firms perceive a lower risk of dismissal even after controlling for establishment and worker characteristics as well as 4-digit industry dummies. In order to better control for unobserved heterogeneity across workers, col (2) adds the individual wage to the previous specification. The results are virtually unchanged: the risk of dismissal perceived by workers remains lower in family firms. An important point highlighted by our results on the family/non-family wage gap is that it is essentially driven by the difference in wages for lower skilled workers (blue-collars and clerks).

The REPONSE data also allow us to investigate whether the perception of the risk of dismissal varies across occupations in family versus non-family firms<sup>47</sup>. If family firms do offer a different compensation package including lower wages but more job security, the gap in (perceived) job security across family and non-family firms should be particularly large for lower skilled workers to the extent that the family non-family wage gap is larger for them than for managers, supervisors and technicians. The results are presented in cols (3) and (4) of Table 10 – Panel A. They indeed suggest that the risk of dismissal perceived by workers is particularly low for blue-collars and clerks in family firms: the coefficient on the interaction between lower occupations and family ownership is negative and significant. This is robust to controlling for individual wages – see col (4) - and the difference in coefficients between lower and higher-skilled workers interacted with family ownership is significant at the 10% level. The last two columns of Panel A present establishment fixed-effect estimates. In this specification, the low/high occupation gap in the effect of family firms on the perceived risk of dismissal is still negatively-signed but no longer significant – see cols (3) and (4). This finding might be due to the fact that our dependent

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<sup>45</sup> The fact that the risk of job loss is smaller in family firms provides also further confirmation of the fact that worker heterogeneity does not bias the results of our wage equations. Indeed, if more able workers were sorting into non-family firms, to the extent that dismissal risk is correlated with ability, we would expect dismissal rates to be higher in family firms and not the opposite, which we find.

<sup>46</sup> This perceived risk may be "very high", "high", "low" or "zero".

<sup>47</sup> The specification that we use here is the same as the one used for wages – see equation (6) in Section 1 above.

variable is coded into only four categories – in contrast to wages, which are continuous. This generates a lot of measurement error, thereby inflating our standard errors without biasing our point estimates.

The risk of dismissal being highly subjective, it may be affected by workers' psychology: for a given level of the "objective" risk of job loss, some workers may be more sensitive than others to the risk of losing their job. The REPOSE survey has two questions that may help us capturing workers' sensitivity to the risk of job loss: workers are asked about what encourages them to invest in their job and what disturbs them; among other items, the question is asked with respect to the risk of losing one's job. In Table 10 – Panel B, we re-run the specifications of Panel A controlling for these two variables. Note that, given that they may be endogenous, we need to remain cautious when interpreting the results. Nevertheless, the results confirm that the risk of dismissal perceived by workers is lower in family firms – cols (1) and (2) – and that this is particularly so for lower skilled workers – cols (3) and (4). An interesting point is that when controlling for the sensitivity to dismissals, the low-high occupation gap in the perceived risk of dismissal across family/non-family firms becomes significant at the 10% level – cols (5) and (6).

Overall, our analysis suggests that family firms do offer more job security than non-family ones. This holds both for "objective" measures of job security (dismissals and the reliance on separations in case of downsizing) and for the subjective perception of the risk of dismissal. An interesting feature of our results is that the perceived risk of dismissal is particularly low for low-skilled workers in family firms, while this group is also the one with the greatest family/non-family gap in pay. This pattern of results is consistent with the idea that family firms offer a specific compensation package characterised by lower wages but greater job security, and this package is particularly different in the case of blue collars and clerks.

## Conclusions

In this paper, we provide evidence that French family firms offer a specific compensation package to their employees involving lower wages but greater job security. Controlling for several establishment and individual characteristics we still find that family firms pay their employees about 3% less than non-family firms, and this finding does not appear to be due to unobserved establishment or individual heterogeneity. We also find that this gap is relatively homogeneous across workers with different gender, educational attainment and age – the latter if account is taken for establishment differences in terms of ICT intensity. By contrast, the family/non-family wage gap appears to be larger for clerks and blue-collar workers than for managers, supervisors and technicians, for whom we find no significant wage gap. *Ceteris paribus*, family firms also appear to have a 15% lower dismissal rate than non-family firms. Moreover, when hit by a negative shock that induces employment downsizing, family firms appear to rely

less on dismissals and more on hiring contraction than non-family firms in order to achieve the required staff adjustment. These results are confirmed by information on the workers' perception of the risk of job loss: workers in family firms feel that their job is more secure, even conditional on their wage level. Moreover the family/non-family gap in the perception of job security is larger for blue collars and clerks, thereby matching the result on wages, although the difference in this gap across occupations is only mildly significant.

What explains this difference between family and non-family firms in terms of compensation packages? Natural explanations of why wages can be smaller in family firms include the fact that these firms tend to be specialised into low-skilled activities and to be less unionised. Even if we do not deny that these explanations can have some explanatory power, our results suggest that they do not provide the whole story. We also investigate whether the fact that family firms are less innovative, and therefore less productive, could account for the wage gap, but we find that including controls for ICT intensity, managerial practices and productivity does not significantly alter our results. Finally, even if firms with concentrated ownership can better control managers' actions, our results do not appear to be easily explainable by agency theory and the literature on entrenched CEOs. First, this literature would suggest that the wage gap should be larger for managers, who are more directly monitored by owners and closer co-workers of the CEO. In contrast, our results suggest, if anything, that the family wage penalty is larger for workers in lower skilled occupations. Second, to the extent that entrenched CEOs would provide additional benefits to their co-workers, in order to enjoy a better working environment, one would expect to find greater job security in non-family firms, while we find the opposite.

By contrast, our findings seem consistent with a multiple equilibrium model, in which family firms are in a low-pay/high-job-security equilibrium, while non-family firms are in a high-pay/low-job-security one. As suggested by the literature in finance, family firms have a comparative advantage at credibly committing to long-term relationships, including long-lasting job matches. The main reason for this is that families have long-term horizons and are therefore more prone to investment opportunities that are profitable only in the long-run (see e.g. Anderson and Reeb, 2003, Bertrand and Schoar, 2006). In this context, the high level of pay in non-family firms could be due to a pure compensating wage differential mechanism. As suggested by Sraer and Thesmar (2007), given that non-family firms offer lower job security, they need to offer sufficiently higher wages in order to attract workers. In equilibrium, all workers would then be indifferent between working in a family or a non-family firm. The implication of this mechanism is that, *ceteris paribus*, family firms would have a competitive advantage over non-family ones: the fact that they can commit to long-lasting matches would allow them to benefit from lower labour costs than non-family firms, for *any* worker. Alternatively, as suggested by Bandiera et al. (2010) for managers, workers with different preferences might sort into firms with different ownership status. In

this case, each firm would elicit a different compensation package according to its comparative advantage. Non-family firms, being more modern and dynamic, would offer stronger wage incentives, while family firms would offer greater job security. As a consequence, workers who are less sensitive to wage incentives but value job security more would sort into family firms, while those who are more career-oriented would go to non-family ones.<sup>48</sup> In contrast to what occurs in the compensating differential model, the sorting of workers according to their preferences does not have obvious implications in terms of the competitive advantage of family firms with respect to non family ones. The evidence we provide in this paper is consistent with both stories. Disentangling among them appears to be a promising avenue for future research.

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<sup>48</sup> Note, however, that this story would not imply that the wage differential would be due to heterogeneity in workers' productivities, since we control for firm-level productivity in our estimates (see also the discussion in Section 3.1.b above). Interpreting our estimates in the light of this story would imply that if a worker with a preference for job security ended up by mistake in a non-family firm, she would still earn a higher wage.

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## Tables

**Table 1 Family firms and wages**

**Panel A - Establishment-level wages**

Dependent variable	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage
Family firm	-0.238*** (0.016)	-0.101*** (0.014)	-0.070*** (0.012)	-0.028*** (0.009)
Observations	2539	2492	2492	2485
R-squared	0.123	0.474	0.676	0.822
establishment controls	no	yes	yes	yes
2-digit dummies	no	yes	no	no
4-digit dummies	no	no	yes	yes
workers' characteristics	no	no	no	yes

**Panel B - Individual-level wages**

Dependent variable	(1) Log Wage	(2) Log Wage	(3) Log Wage
Family firm	-0.108*** (0.011)	-0.048*** (0.011)	-0.041*** (0.011)
Observations	6615	6500	6500
R-squared	0.487	0.558	0.606
establishment controls	no	yes	yes
2-digit dummies	no	yes	no
4-digit dummies	no	no	yes
workers' controls - education	yes	yes	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the log of the wage. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) Establishment controls include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (4) Industry dummies correspond either to the 2-digit NACE (Rev.1) or 4-digit NACE (Rev.1) classifications. (5) In establishment-level regressions, *workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). (6) In individual wage regressions *workers' controls* are: age (8 classes), tenure (4 classes), education (7 classes), gender and a dummy variable for working full time. (7) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 2 Family Firms, ICT and Management Practices**

Dependent variable	(1) ICT	(2) ICT	(3) ICT	(4) Management Practices	(5) Management Practices	(6) Management Practices
Family firm	-0.289*** (0.043)	-0.190*** (0.039)	-0.126*** (0.037)	-0.343*** (0.046)	-0.266*** (0.051)	-0.251*** (0.049)
Observations	2483	2483	2476	2004	2004	1999
R-squared	0.331	0.570	0.636	0.318	0.448	0.483
establishment controls	yes	yes	yes	yes	yes	yes
2-digit dummies	yes	no	no	yes	no	no
4-digit dummies	no	yes	yes	no	yes	yes
workers' characteristics	no	no	yes	no	no	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is either the intensity of the use of information and communication technologies (ICT) or the intensity of use of innovative managerial practices (Management Practices). *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (4) Industry dummies correspond either to the 2-digit NACE (Rev.1) or 4-digit NACE (Rev.1) classifications. (5) *Workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars. (6) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 3 Family firms and wages controlling for ICT and management practices**  
**Panel A - Establishment-level wages**

Dependent variable	(1) Log Wage	(2) Log Wage
Family firm	-0.026** (0.010)	-0.022** (0.010)
ICT	0.038*** (0.007)	
Management Practices	0.001 (0.006)	
Log productivity		0.100*** (0.018)
Observations	1997	1976
R-squared	0.818	0.833
establishment controls	yes	yes
4-digit dummies	yes	yes
workers' characteristics	yes	yes

**Panel B - Individual-level wages**

Dependent variable	(1) Log Wage	(2) Log Wage
Family firm	-0.029** (0.013)	-0.027** (0.012)
ICT	0.052*** (0.008)	
Management Practices	0.010 (0.007)	
Log productivity		0.120*** (0.019)
Observations	5297	5180
R-squared	0.611	0.611
establishment controls	yes	yes
4-digit dummies	yes	yes
workers' controls - education	yes	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the log of the wage. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) *ICT* and *Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices. *Log productivity* is the log of value added per worker. (4) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (5) Industry dummies correspond to the 4-digit NACE (Rev.1) classification. (6) In establishment-level regressions, *workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). (7) In individual wage regressions *workers' controls* are: age (8 classes), tenure (4 classes), education (7 classes), gender and a dummy variable for working full time. (8) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 4 Family firms and wages - First differences**

Dependent variable	(1) $\Delta(\log \text{ gross annual wage})$	(2) $\Delta(\log \text{ gross annual wage})$	(3) $\Delta(\log \text{ gross annual wage})$	(4) $\Delta(\log \text{ gross annual wage})$	(5) $\Delta(\log \text{ gross annual wage})$
$\Delta(\text{Family firm})$	-0.048*** (0.018)	-0.042*** (0.015)	-0.044*** (0.015)	-0.042*** (0.015)	-0.045** (0.018)
$\Delta(\text{Log productivity})$			0.113** (0.050)	0.110** (0.048)	0.099* (0.052)
Log gross wage in 1998				-0.107*** (0.026)	
Lagged $\Delta(\text{Log annual gross wage})$					-0.137*** (0.049)
Log gross wage in 1992					-0.094*** (0.027)
Observations	470	445	433	433	374
R-squared	0.018	0.216	0.243	0.288	0.272
Other controls	no	yes	yes	yes	yes

Notes:

(1) Each column presents the results of a separate regression run at the firm level, where the dependent variable is the change in the log of the firm gross annual wage per employee between 1998 and 2004.  $\Delta(\text{Family firm})$  denotes the change in family ownership between 1998 and 2004. It is defined as: family ownership in 2004 – family ownership in 1998. (2) Robust standard errors in parentheses. (3)  $\Delta(\text{Log productivity})$  is the change in the log value-added per employee between 1998 and 2004.  $\text{Lagged } \Delta(\text{Log annual wage})$  is the change in the gross annual wage per employee between 1992 and 1998. (4) All specifications – including col. (1) – control for change in State-ownership, change in workers' ownership and change in ownership by other types of shareholders over 1998-2004. (5) *Other controls* include change in firm size, change in the share of women, change in the occupational structure, change in the presence of union representative, all measured between 1998 and 2004. (6) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 5 Family firms in 1998, ownership changes between 1998 and 2004 and gross annual wage per worker in 1998**

Dependent variable	(1) Log gross annual wage in 1998	(2) Log gross annual wage in 1998	(3) Log gross annual wage in 1998	(4) Log gross annual wage in 1998
Family firm in 1998	-0.111*** (0.020)	-0.123*** (0.024)	-0.052*** (0.015)	-0.045** (0.019)
Change to non-family in 2004		0.014 (0.025)		-0.016 (0.019)
Log productivity in 1998			0.344*** (0.030)	0.347*** (0.030)
Observations	478	470	471	463
R-squared	0.665	0.668	0.796	0.798
firm controls	yes	yes	yes	yes
2-digit dummies	yes	yes	yes	yes
workers' characteristics	yes	yes	yes	yes

Notes:

(1) Each column presents the results of a separate regression run at the firm level, where the dependent variable is the log of the firm gross annual wage per employee in 1998. *Family firm in 1998* indicates whether the firm was family-owned in 1998. (2) Robust standard errors in parentheses. (3) *Change to non-family in 2004* denotes a change in ownership status of the firm from family to non-family between 1998 and 2004. *Log productivity in 1998* is the log of value added per worker in 1998. (4) *Firm controls* include firm size, age, region and the presence of union representative in 1998. (5) Industry dummies correspond to the 2-digit NACE (Rev.1) classification. (6) *Workers' characteristics* include: the proportion of women and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars measured at the firm level in 1998. (7) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 6 Family firms and wages – High versus low turnover industries****Panel A - Establishment-level wages**

Dependent variable	High turnover industries		Low turnover industries	
	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage
Family firm	-0.015 (0.016)	-0.008 (0.014)	-0.027* (0.014)	-0.022 (0.014)
ICT	0.038*** (0.011)		0.037*** (0.009)	
Management Practices	-0.000 (0.009)		0.001 (0.007)	
Log productivity		0.116*** (0.023)		0.083*** (0.025)
Observations	955	975	1033	991
R-squared	0.785	0.795	0.849	0.870
establishment controls	yes	yes	yes	yes
4-digit dummies	yes	yes	yes	yes
workers' characteristics	yes	yes	yes	yes

**Panel B - Individual-level wages**

Dependent variable	High turnover industries		Low turnover industries	
	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage
Family firm	-0.006 (0.019)	-0.004 (0.018)	-0.042** (0.017)	-0.045*** (0.017)
ICT	0.062*** (0.013)		0.041*** (0.011)	
Management Practices	0.011 (0.010)		0.009 (0.010)	
Log productivity		0.131*** (0.026)		0.113*** (0.026)
Observations	2554	2584	2715	2564
R-squared	0.590	0.577	0.635	0.646
establishment controls	yes	yes	yes	yes
4-digit dummies	yes	yes	yes	yes
workers' controls - education	yes	yes	yes	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the log of the wage. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) High (resp. low) turnover industries are industries with firm turnover above (resp. below) the median of all industries. (4) *ICT* and *Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices. *Log productivity* is the log of value added per worker. (5) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (6) Industry dummies correspond to the 4-digit NACE (Rev.1) classification. (7) In establishment-level regressions, *workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). (8) In individual wage regressions *workers' controls* are: age (8 classes), tenure (4 classes), education (7 classes), gender and a dummy variable for working full time. (9) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 7 Heterogeneity across workers**  
**Panel A - Education and Gender**

Dependent variable	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage
Family firm*Below high-school diploma	-0.034** (0.015)			
Family firm*High-school diploma or above	-0.021 (0.017)			
Family*(Below High school – High school or above)		-0.018 (0.019)		
Family firm*Women			-0.044*** (0.016)	
Family firm*Men			-0.020 (0.015)	
Family*(Women - Men)				-0.021 (0.020)
Observations	5297	5086	5297	5086
R-squared	0.611	0.772	0.611	0.772
establishment controls	yes	no	yes	no
4-digit dummies	yes	no	yes	no
ICT and managerial practices	yes	no	yes	no
workers' controls - education	yes	yes	yes	yes
Establishment fixed effects	no	yes	no	yes

**Table 7 Heterogeneity across workers (cont.)****Panel B - Age**

Dependent variable	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage
Family firm*Above 40 years old	-0.048*** (0.016)			
Family firm*40 years old and below	-0.010 (0.015)			
Family firm*(Above - Below 40 years old)		-0.035** (0.017)	-0.045** (0.019)	0.002 (0.020)
ICT intensive firm*(Above - Below 40 years old)				0.046*** (0.012)
Management Practices*(Above - Below 40 years old)				-0.003 (0.011)
Family firm*3-5 years of tenure <sup>(3)</sup>			-0.018 (0.028)	
Family firm*6-10 years of tenure <sup>(3)</sup>			0.016 (0.029)	
Family firm*More than 10 years of tenure <sup>(3)</sup>			0.021 (0.027)	
Observations	5297	5086	5086	4151
R-squared	0.611	0.772	0.772	0.772
establishment controls	yes	no	no	no
4-digit dummies	yes	no	no	no
ICT and managerial practices	yes	no	no	no
workers' controls - education	yes	yes	yes	yes
Establishment fixed effects	no	yes	yes	yes



**Table 7 Heterogeneity across workers (cont.)****Panel C - Occupations**

Dependent variable	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage	(5) Log Wage	(6) Log Wage
Family firm*Blue Collars and Clerks	-0.036*** (0.013)					
Family firm*Technicians, Supervisors and Managers	-0.013 (0.015)					
Family firms*(Lower – Higher occupations) <sup>(4)</sup>		-0.046*** (0.016)		-0.050*** (0.016)	-0.040** (0.019)	-0.034* (0.019)
ICT intensive firm*(Lower – Higher occupations) <sup>(4)</sup>					0.029** (0.012)	0.030** (0.013)
Management Practices *(Lower – Higher occupations) <sup>(4)</sup>					0.007 (0.011)	0.004 (0.011)
Presence of Union Rep. * (Lower – Higher occupations) <sup>(4)</sup>						0.026 (0.020)
Family firm*(Above - Below 40 years old)				-0.005 (0.014)		
Blue Collars and Clerks * (Above - Below 40 years old)				-0.099*** (0.015)		
Family firm*Clerks <sup>(5)</sup>			-0.043* (0.023)			
Family firm*Blue collars <sup>(5)</sup>			-0.050** (0.020)			
Family firm*Managers <sup>(5)</sup>			-0.003 (0.026)			
Observations	5162	4961	4961	4961	4041	4035
R-squared	0.720	0.851	0.851	0.854	0.854	0.853
establishment controls	yes	no	no	no	no	no
4-digit dummies	yes	no	no	no	no	no
ICT and management practices	yes	no	no	no	no	no
workers' ctrls - educ+occup	yes	yes	yes	yes	yes	yes
Establishment fixed effects	no	yes	yes	yes	yes	yes

Notes:

*Reading:* Panel C, col. (1), first line: blue-collars and clerks earn 3.6% less in family than in non-family firms. Panel C, col. (2), 3<sup>rd</sup> line: the (negative) difference in wages between workers in lower and higher occupations is 4.6 percentage points larger in family firms than in non-family firms. (1) Each column presents the results of a separate regression where the dependent variable is the log of the wage. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) The reference for tenure is 0 to 2 years. (4) *Higher occupations* are Technicians, Supervisors and Managers. *Lower occupations* are blue collars and clerks. (5) The reference for occupations (when disaggregated in four groups) is Technicians and Supervisors. (6) *ICT and Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices. (7) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (8) Industry dummies correspond to the 4-digit NACE (Rev.1) classification. (9) *Workers' controls* are: age (8 classes), tenure (4 classes), education (7 classes), gender and a dummy variable for working full time. Occupation (4 classes) is added to the controls in Panel C. (10) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 8 Family firms and separations****Panel A – Baseline, 2000-2007**

	(1)	(2)	(3)	(4)	(5)	(6)
	Dismissals	Quits	Retirem.	End-trial	End-fixed term	All separat.
Family firm	-0.095*** (0.036)	0.091 (0.066)	0.013 (0.013)	0.026 (0.021)	0.129 (0.244)	0.119 (0.290)
Observations	41579	41579	41579	41579	41579	41579
R-squared	0.052	0.257	0.102	0.201	0.198	0.213
time dummies	yes	yes	yes	yes	yes	yes
establishment controls	yes	yes	yes	yes	yes	yes
4-digit dummies	yes	yes	yes	yes	yes	yes
workers' characteristics	yes	yes	yes	yes	yes	yes

**Panel B - With controls for permanent workers**

	(1)	(2)	(3)	(4)	(5)	(6)
	Dismissals	Quits	Retirem.	End-trial	End-fixed term	All separat.
Family firm	-0.084** (0.037)	0.123* (0.067)	0.014 (0.013)	0.034 (0.021)	-0.139 (0.176)	-0.090 (0.236)
% permanent workers	0.003** (0.001)	0.011*** (0.002)	0.001** (0.000)	0.002*** (0.001)	-0.049** (0.022)	-0.032 (0.022)
Observations	40972	40972	40972	40972	40972	40972
R-squared	0.051	0.259	0.102	0.203	0.241	0.230
time dummies	yes	yes	yes	yes	yes	yes
establishment controls	yes	yes	yes	yes	yes	yes
4-digit dummies	yes	yes	yes	yes	yes	yes
workers' characteristics	yes	yes	yes	yes	yes	yes

**Table 8 Family firms and separations (cont.)****Panel C – 2004-2007**

	(1)	(2)	(3)	(4)	(5)	(6)
	Dismissals	Quits	Retirem.	End-trial	End-fixed term	All separat.
Family firm	-0.116** (0.052)	0.090 (0.081)	0.024 (0.019)	0.050 (0.031)	0.317 (0.342)	0.307 (0.392)
Observations	21568	21568	21568	21568	21568	21568
R-squared	0.071	0.277	0.123	0.244	0.213	0.199
time dummies	yes	yes	yes	yes	yes	yes
establishment controls	yes	yes	yes	yes	yes	yes
4-digit dummies	yes	yes	yes	yes	yes	yes
workers' characteristics	yes	yes	yes	yes	yes	yes

**Panel D - Controlling for job creation and job destruction**

	(1)	(2)	(3)	(4)	(5)	(6)
	Dismissals	Quits	Retirem.	End-trial	End-fixed term	All separat.
Family firm	-0.104** (0.041)	0.090 (0.066)	0.013 (0.013)	0.025 (0.021)	0.111 (0.224)	0.063 (0.268)
JCR	0.008 (0.006)	-0.002 (0.003)	-0.000 (0.001)	0.001 (0.001)	-0.000 (0.025)	0.041 (0.026)
JDR	0.116*** (0.043)	0.031*** (0.009)	0.010** (0.004)	-0.000 (0.001)	0.340*** (0.088)	0.763*** (0.115)
Observations	41579	41579	41579	41579	41579	41579
R-squared	0.159	0.267	0.112	0.201	0.297	0.498
time dummies	yes	yes	yes	yes	yes	yes
establishment controls	yes	yes	yes	yes	yes	yes
4-digit dummies	yes	yes	yes	yes	yes	yes
workers' characteristics	yes	yes	yes	yes	yes	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the separation rate computed, at the establishment level, for each type of separation (rate of dismissals, rate of quits etc.). For each type of separation, it is computed as the total number of such separations during a quarter over the average employment level during that quarter. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) % of *permanent workers* is the proportion of workers on open-ended contracts in the establishment. (4) *JCR* and *JDR* are respectively the job creation and job destruction rates in the establishment. The *JCR* (resp. *JDR*) is defined as the ratio of the net growth rate of employment between the beginning and the end of a quarter to the average employment level during that quarter, if the former is positive (resp. negative). (5) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. They also include the intensity of use of information and communication technologies as well as of innovative managerial practices. (6) Industry dummies correspond to the 4-digit NACE (Rev.1) classification. (7) *Workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). (8) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 9 Sensitivity of dismissal and hiring rates to job creation and job destruction****Panel A: Dismissal rates, job creation and job destruction**

	(1)	(2)	(3)	(4)	(5)
	Dismissal rate	Dismissal rate	Dismissal rate	Dismissal rate	Dismissal rate
JCR	0.021*** (0.008)	0.033** (0.017)	0.059** (0.024)	0.002 (0.050)	0.023 (0.035)
JDR	0.123*** (0.032)	0.192*** (0.066)	0.311*** (0.082)	0.293* (0.176)	0.332** (0.146)
JCR x Family firm		-0.033* (0.017)	-0.039** (0.020)	-0.027* (0.016)	-0.016* (0.009)
JDR x Family firm		-0.160** (0.066)	-0.185** (0.076)	-0.134** (0.056)	-0.064* (0.033)
Observations	54219	51935	51889	41579	41579
R-squared	0.246	0.290	0.368	0.486	0.702
establishment fixed-effects	yes	yes	yes	yes	yes
time dummies	yes	yes	yes	yes	yes
establishment controls x JCR/JDR	no	no	no	yes	yes
2-digit dummies x JCR/JDR	no	no	no	no	yes
workers' characteristics x JCR/JDR	no	no	yes	yes	yes

**Panel B: Hiring rates, job creation and job destruction**

	(1)	(2)	(3)	(4)	(5)
	Hiring rate	Hiring rate	Hiring rate	Hiring rate	Hiring rate
JCR	1.013*** (0.013)	1.027*** (0.015)	1.001*** (0.057)	1.309*** (0.094)	1.300*** (0.107)
JDR	-0.248*** (0.032)	-0.132*** (0.025)	-0.229* (0.138)	0.396 (0.260)	0.742*** (0.254)
JCR x Family firm		-0.032 (0.026)	-0.055** (0.027)	-0.087*** (0.026)	-0.071*** (0.026)
JDR x Family firm		-0.240*** (0.066)	-0.230*** (0.070)	-0.146*** (0.052)	-0.149*** (0.052)
Observations	54219	51935	51889	41579	41579
R-squared	0.752	0.758	0.762	0.779	0.788
establishment fixed-effects	yes	yes	yes	yes	yes
time dummies	yes	yes	yes	yes	yes
establishment controls x JCR/JDR	no	no	no	yes	yes
2-digit dummies x JCR/JDR	no	no	no	no	yes
workers' characteristics x JCR/JDR	no	no	yes	yes	yes

Notes: (1) Each column presents the results of a separate regression where the dependent variable is the either the dismissal or the hiring rate at the establishment level. They are computed as the total number of dismissals (resp. hires) during a quarter over the average employment level during that quarter. *Family firm* indicates whether the establishment is part of a firm which is family-owned. *JCR* and *JDR* are respectively the job creation and job destruction rates in the establishment. The *JCR* (resp. *JDR*) is defined as the ratio of the net growth rate of employment between the beginning and the end of a quarter to the average employment level during that quarter, if the former is positive (resp. negative). (2) Robust standard errors in parentheses. (3) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. They also include the intensity of use of information and communication technologies as well as of innovative managerial practices. (4) Industry dummies correspond to the 2-digit NACE (Rev.1) classification. (5) *Workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). (6) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 10 Family firms and perceived risk of dismissal****Panel A – Family firms, perceived risk of dismissal and occupations**

	(1) Risk of dismissal	(2) Risk of dismissal	(3) Risk of dismissal	(4) Risk of dismissal	(5) Risk of dismissal	(6) Risk of dismissal
Family firm	-0.108*** (0.040)	-0.110*** (0.040)				
Family firm*Technicians, Supervisors and Managers			-0.053 (0.047)	-0.054 (0.047)		
Family firm*Blue Collars and Clerks			-0.158*** (0.051)	-0.159*** (0.052)		
Family firms*(Lower – Higher occupations)					-0.070 (0.071)	-0.069 (0.071)
Log wage		-0.086 (0.055)		-0.052 (0.066)		0.025 (0.083)
Observations	4364	4364	4260	4260	4045	4045
R-squared	0.194	0.195	0.198	0.198	0.552	0.552
establishment controls	yes	yes	yes	yes	no	no
ICT and management practices	yes	yes	yes	yes	no	no
4-digit dummies	yes	yes	yes	yes	no	no
workers' ctrls - educ only	yes	yes	no	no	no	no
workers' ctrls – educ + occup	no	no	yes	yes	yes	yes
establishment fixed-effects	no	no	no	no	yes	yes

**Table 10 Family firms and perceived risk of dismissal (cont.)****Panel B – With controls for sensitivity to dismissal**

	(1) Risk of dismissal	(2) Risk of dismissal	(3) Risk of dismissal	(4) Risk of dismissal	(5) Risk of dismissal	(6) Risk of dismissal
Family firm	-0.104*** (0.036)	-0.104*** (0.036)				
Family firm*Technicians, Supervisors and Managers			-0.030 (0.042)	-0.030 (0.043)		
Family firm*Blue Collars and Clerks			-0.179*** (0.047)	-0.178*** (0.047)		
Family firms*(Lower – Higher occupations)					-0.131* (0.069)	-0.127* (0.069)
Log wage		0.020 (0.048)		0.017 (0.058)		0.101 (0.078)
Observations	4189	4189	4095	4095	3879	3879
R-squared	0.330	0.331	0.332	0.332	0.616	0.616
establishment controls	yes	yes	yes	yes	no	no
ctrls for ICT and managerial practices	yes	yes	yes	yes	no	no
4-digit dummies	yes	yes	yes	yes	no	no
workers' ctrls - educ only	yes	yes	no	no	no	no
workers' ctrls – educ + occup	no	no	yes	yes	yes	yes
sensitivity to dismissal	yes	yes	yes	yes	yes	yes
establishment fixed-effects	no	no	no	no	yes	yes

Notes:

(1) Each column presents the results of a separate regression, run at the individual worker level, where the dependent variable is the perceived risk of dismissal. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) *Higher occupations* are Technicians, Supervisors and Managers. *Lower occupations* are blue collars and clerks. *Log wage* is the log of the net hourly wage. (4) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (5) *ICT* and *Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices. (6) Industry dummies correspond to the 4-digit NACE (Rev.1) classification. (7) *Workers' controls* are: age (8 classes), tenure (4 classes), gender, a dummy variable for working full time and education (7 classes). In cols (3) to (6), controls also include occupation (4 classes). (8) *Sensitivity to dismissals* is captured by 2 ordinal variables indicating whether workers are either pushed to, or prevented from, invest(ing) in their work by the risk of losing their job. (9) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

## Appendix Tables

**Appendix, table A1**  
**Means of variables in cross section (2004), establishment level**

<i>Variables</i>	Whole sample (2650 obs.)		Establishments belonging to family firms (1081 obs.)		Establishments belonging to non family firms (1037 obs.)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Family firms	0.561	0.496	1.000	0.000	0.000	0.000
Worker-owned firms	0.032	0.176	0.000	0.000	0.000	0.000
State-owned firms	0.027	0.163	0.000	0.000	0.000	0.000
Dispersed ownership, private equity, joint-ventures	0.301	0.459	0.000	0.000	1.000	0.000
Other holders, not elsewhere classified	0.078	0.268	0.000	0.000	0.000	0.000
ICT use (standardised index)	0	1	-0.211	0.961	0.236	0.972
Management practices (standardised index)	0	1	-0.247	0.963	0.332	0.958
Establishment size (total employees)	79.075	175.384	61.372	117.167	104.724	229.327
Establishment age:						
less than 5 years	0.042	0.201	0.034	0.182	0.060	0.238
5 to 9 years	0.100	0.301	0.091	0.288	0.106	0.307
10 to 19 years	0.268	0.443	0.282	0.450	0.249	0.433
20 to 49 years	0.405	0.491	0.416	0.493	0.407	0.492
50 years or more	0.184	0.387	0.176	0.381	0.178	0.382
Workforce structure						
Share of managers	0.128	0.175	0.088	0.131	0.170	0.201
Share of supervisors and technicians	0.217	0.187	0.190	0.174	0.251	0.198
Share of clerks	0.247	0.278	0.254	0.286	0.210	0.255
Share of blue-collar workers	0.398	0.333	0.458	0.330	0.362	0.328
Share of females	0.359	0.256	0.350	0.264	0.342	0.233
Share of employees below 40 years old	0.580	0.194	0.588	0.187	0.569	0.199
Presence of union representative	0.365	0.482	0.243	0.429	0.522	0.500
Share of fixed-term contracts	0.048	0.114	0.053	0.126	0.034	0.073
Average net hourly wage (€)	11.200	4.368	10.142	2.974	12.551	5.506
Listed firms	0.019	0.135	0.016	0.126	0.016	0.127
Value-added per employee (in K€)	57.366	63.844	47.359	22.445	70.462	107.041

Notes : all variables are weighted by REPONSE sampling weights.

**Appendix, table A2**  
**Means of variables in cross section (2004), individual level**

<i>Variables</i>	Whole sample (6945 obs.)		Establishments belonging to family firms (2672 obs.)		Establishments belonging to non family firms (2843 obs.)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Female	0.373	0.484	0.390	0.488	0.347	0.476
Education						
No diploma	0.179	0.384	0.217	0.412	0.157	0.363
Lower secondary education	0.063	0.242	0.069	0.254	0.061	0.239
Lower technical education	0.320	0.467	0.348	0.476	0.311	0.463
High school diploma	0.132	0.339	0.130	0.336	0.132	0.338
College degree	0.150	0.357	0.130	0.336	0.164	0.370
Master degree	0.068	0.251	0.058	0.234	0.072	0.259
Beyond master degree	0.088	0.284	0.048	0.215	0.104	0.305
Occupation						
Manager	0.208	0.406	0.145	0.352	0.247	0.431
Supervisor or technician	0.279	0.448	0.229	0.420	0.312	0.464
Clerk	0.164	0.370	0.217	0.412	0.109	0.312
Blue collar	0.349	0.477	0.410	0.492	0.332	0.471
Full time worker	0.904	0.295	0.887	0.317	0.936	0.245
Age	40.109	9.561	39.454	9.740	40.629	9.443
Tenure	12.014	10.187	10.854	9.792	12.683	10.385
Perceived risk of dismissal (1-4 index)	1.842	0.838	1.800	0.843	1.918	0.850
Sensitivity to dismissal : job insecurity as preventing from investing in one's job (1 to 4 scale)	1.969	0.955	1.986	0.977	1.997	0.948
Sensitivity to dismissal : job insecurity as an incentive to invest in one's job (1 to 4 scale)	2.158	1.015	2.211	1.047	2.158	1.005
Net hourly wage (€)	12.457	5.860	10.918	5.095	13.481	6.128

Notes : all variables are weighted by REPOSE sampling weights.



**Appendix. table A3**  
**Means of variables in 1998, firm level (panel subsample)**

<i>Variables</i>	Panel (622 obs)	
	Mean	Std. Dev.
Family firms	0.589	0.492
Change to family ownership (-1. 0. 1 index)	-0.001	0.448
Worker owned firms	0.042	0.200
State owned firms	0.023	0.150
Dispersed ownership. private equity. joint-ventures	0.302	0.459
Other holders. not elsewhere classified	0.044	0.206
Annual gross wage per employee (in K€)	23.260	8.649
Value-added per employee (in K€)	48.447	23.919
Firm size (total employees)	475.040	2767.468
Workforce structure		
Share of managers	0.127	0.140
Share of supervisors and technicians	0.150	0.141
Share of clerks	0.285	0.285
Share of blue collar workers	0.433	0.332
Share of females	0.300	0.261
Presence of union representative	0.366	0.481

Notes: all variables are weighted by REPONSE sampling weights. The index for change in family ownership takes value -1 if the firm was family owned in 1998 and became non-family owned between 1998 and 2004, 1 if the firm became family owned in 2004 while it was not in 1998, and 0 otherwise.

**Appendix, table A4**

**Average of quarterly gross job and worker flows in percentage of employment, establishment level, 2000-2007**

<i>Variables (in %)</i>	Whole sample (2298 obs.)		Establishments belonging to family firms (878 obs.)		Establishments belonging to non family firms (947 obs.)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Job creation rate	2.65	3.71	2.90	4.34	2.24	2.26
Job destruction rate	2.25	4.58	2.00	3.25	2.91	6.82
Hiring rate	5.60	7.67	6.17	7.85	4.78	7.71
Separation rate	5.20	7.88	5.27	6.91	5.45	10.16
By reason of separation:						
Dismissal	0.51	0.88	0.48	0.84	0.65	1.01
Quit	1.53	2.66	1.62	2.47	1.44	2.91
Retirement	0.14	0.25	0.13	0.22	0.17	0.29
End of trial period	0.26	1.21	0.24	0.68	0.33	1.89
End of fixed-term contract	2.25	4.40	2.42	4.79	2.01	4.18

Notes : all variables are weighted by REPONSE sampling weights.

**Appendix Table A5 Family firms and wages - Individual-level wages with occupational controls**

VARIABLES	(1) Log Wage	(2) Log Wage	(3) Log Wage	(4) Log Wage	(5) Log Wage
Family firm	-0.093*** (0.010)	-0.040*** (0.010)	-0.034*** (0.010)	-0.027** (0.012)	-0.023** (0.011)
ICT				0.030*** (0.007)	
Management practices				0.008 (0.006)	
Log productivity					0.109*** (0.017)
Observations	6455	6344	6344	5162	5048
R-squared	0.605	0.661	0.702	0.703	0.714
establishment controls	no	yes	yes	yes	yes
2-digit dummies	no	yes	no	no	no
4-digit dummies	no	no	yes	yes	yes
workers' controls - occupations	yes	yes	yes	yes	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the log of the wage. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) *ICT* and *Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices. *Log productivity* is the log of value added per worker. (4) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (5) Industry dummies correspond either to the 2-digit NACE (Rev.1) or 4-digit NACE (Rev.1) classifications. (6) *Workers' controls* are: age (8 classes), tenure (4 classes), occupation (4 classes), gender and a dummy variable for working full time. (7) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Appendix Table A6 Family firms and productivity**

VARIABLES	(1) logProd	(2) logProd	(3) logProd	(4) logProd
Family firm	-0.216*** (0.030)	-0.098*** (0.028)	-0.062** (0.026)	-0.032 (0.030)
ICT				0.053** (0.021)
Management practices				0.074*** (0.021)
Observations	1678	1678	1674	1374
R-squared	0.164	0.510	0.560	0.560
firm controls	yes	yes	yes	yes
2-digit dummies	yes	no	no	no
4-digit dummies	no	yes	yes	yes
workers' characteristics	no	no	yes	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the log of value-added per worker measured at the firm level. *(mean) family firm* indicates whether the firm is family-owned. *(mean) ICT* and *(mean) Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices both measured at the firm level. (2) Robust standard errors in parentheses. (3) *Firm controls* include: firm size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the firm is State-owned, workers-owned or belongs to other types of shareholders. (4) Industry dummies correspond either to the 2-digit NACE (Rev.1) or 4-digit NACE (Rev.1) classifications. (5) *Workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). They are all measured at the firm level. (6) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Appendix Table A7 Family firms and labour cost per worker in 2004**

VARIABLES	(1) Log gross annual wage in 2004	(2) Log gross annual wage in 2004	(3) Log gross annual wage in 2004
Family firm	-0.069*** (0.014)	-0.048*** (0.012)	-0.063*** (0.015)
ICT			0.064*** (0.010)
Management practices			0.016* (0.010)
Log productivity		0.267*** (0.030)	
Observations	1701	1673	1399
R-squared	0.630	0.734	0.633
firm controls	yes	yes	yes
2-digit dummies	yes	yes	yes
workers' characteristics	yes	yes	yes

Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the log of the gross annual wage per employee in 2004 measured at the firm level. *(mean) family firm* indicates whether the firm is family-owned. *(mean) ICT* and *(mean) Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices both measured at the firm level. (2) Robust standard errors in parentheses. (3) *Firm controls* include: firm size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the firm is State-owned, workers-owned or belongs to other types of shareholders. (4) Industry dummies correspond to the 2-digit NACE (Rev.1) classification. (5) *Workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). They are all measured at the firm level. (6) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

# Appendix Table A8 - Heterogeneity across workers

## Age - 35 year old threshold

VARIABLES	(1) log Wage	(2) log Wage	(3) log Wage	(4) log Wage
Family firm*Above 35 years old	-0.049*** (0.014)		-0.049** (0.020)	0.002 (0.020)
Family firm*35 years old and below	0.008 (0.016)			
Family firm*(Above - below 35 years old)		-0.035** (0.017)		
ICT intensive firm*(Above - below 35 years old)				0.047*** (0.013)
Management Practices*(Above - below 35 years old)				0.008 (0.011)
Family firm*3-5 years of tenure			-0.017 (0.028)	
Family firm*6-10 years of tenure			0.018 (0.029)	
Family firm*More than 10 years of tenure			0.026 (0.028)	
Observations	5297	5086	5086	4151
R-squared	0.612	0.772	0.772	0.772
establishment controls	yes	no	no	no
4-digit dummies	yes	no	no	no
ICT and managerial practices	yes	no	no	no
workers' controls - education	yes	yes	yes	yes
Establishment fixed effects	no	yes	yes	yes

### Notes:

(1) Each column presents the results of a separate regression where the dependent variable is the log of the wage. *Family firm* indicates whether the establishment is part of a firm which is family-owned. (2) Robust standard errors in parentheses. (3) The reference for tenure is 0 to 2 years. (4) *ICT* and *Management Practices* respectively denote the intensity of use of information and communication technologies, and of innovative managerial practices. (5) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. (6) Industry dummies correspond to the 4-digit NACE (Rev.1) classification. (7) *Workers' controls* are: age (8 classes), tenure (4 classes), education (7 classes), gender and a dummy variable for working full time. Occupation (4 classes) is added to the controls in Panel C. (8) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A9 – Sensitivity of total separations and quits to employment changes****Panel A – Separation rates, job creation and job destruction**

VARIABLES	(1) Separ.rate	(2) Separ.rate	(3) Separ.rate	(4) Separ.rate	(5) Separ.rate
JCR	0.013 (0.013)	0.027* (0.015)	0.001 (0.057)	0.309*** (0.094)	0.300*** (0.107)
JDR	0.752*** (0.032)	0.868*** (0.025)	0.771*** (0.138)	1.396*** (0.260)	1.742*** (0.254)
JCR x Family firm		-0.032 (0.026)	-0.055** (0.027)	-0.087*** (0.026)	-0.071*** (0.026)
JDR x Family firm		-0.240*** (0.066)	-0.230*** (0.070)	-0.146*** (0.052)	-0.149*** (0.052)
Observations	54219	51935	51889	41579	41579
R-squared	0.684	0.693	0.698	0.722	0.733
establishment fixed effects	Yes	yes	yes	yes	yes
time dummies	Yes	yes	yes	yes	yes
establishment controls x JCR/JDR	No	no	no	yes	yes
2-digit dummies x JCR/JDR	No	no	no	no	yes
workers' characteristics x JCR/JDR	No	no	yes	yes	yes

**Panel B – Quit rates, job creation and job destruction**

VARIABLES	(1) Quit rate	(2) Quit rate	(3) Quit rate	(4) Quit rate	(5) Quit rate
JCR	-0.004 (0.003)	-0.004 (0.006)	0.011 (0.012)	0.049 (0.031)	0.052 (0.037)
JDR	0.030*** (0.004)	0.020*** (0.005)	0.016 (0.018)	0.012 (0.037)	0.094** (0.047)
JCR x Family firm		-0.001 (0.007)	-0.002 (0.009)	-0.004 (0.007)	-0.005 (0.008)
JDR x Family firm		0.016* (0.008)	0.021** (0.009)	0.012 (0.012)	-0.004 (0.012)
Observations	54,219	51,935	51,889	41,579	41,579
R-squared	0.546	0.547	0.540	0.564	0.573
establishment fixed effects	yes	yes	yes	yes	yes
time dummies	yes	yes	yes	yes	yes
establishment controls x JCR/JDR	no	no	no	yes	yes
2-digit dummies x JCR/JDR	no	no	no	no	yes
workers' characteristics x JCR/JDR	no	no	yes	yes	yes

Notes: (1) Each column presents the results of a separate regression where the dependent variable is either the rate of separation or the quit rate. They are respectively computed as the total number of separations (resp. quits) during a quarter divided by the average employment level during that quarter.. *Family firm* indicates whether the establishment is part of a firm which is family-owned. *JCR* and *JDR* are respectively the job creation and job destruction rates in the establishment. The *JCR* (resp. *JDR*) is defined as the ratio of the net growth rate of employment between the beginning and the end of a quarter to the average employment level during that quarter, if the former is positive (resp. negative). (2) Robust standard errors in parentheses. (3) *Establishment controls* include: establishment size (6 classes), age (5 classes), region, presence of union representative, being listed on the stock market and dummy variables indicating whether the establishment belongs to a firm which is State-owned, workers-owned or which belongs to other types of shareholders. They also include the intensity of use of information and communication technologies as well as of innovative managerial practices. (4) Industry dummies correspond to the 2-digit NACE (Rev.1) classification. (5) *Workers' characteristics* include: the proportion of women, the proportion of workers below 40 years old and the proportion of employees in 4 occupational groups (managers, technicians and supervisors, clerks, blue-collars). (6) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

## **Data Appendix**

### **1. Sample Definition**

#### ***1.1 Wage equations***

The REPONSE dataset has 2,930 establishments in it. We drop all associations, charities and governmental organisations operating in the business sector (258 establishments) as well as establishments with average net hourly wages above 100€ (22 establishments). Our sample for establishment-level wage regressions therefore contains 2,650 establishments. For this subset of establishments our worker dataset contains 7,438 employees. We drop CEOs (who set their own wages). We also drop employees with wages in the top and bottom 1% of the distribution and employees aged 16 to 20 years old and above 60. Our sample for individual-level wage regressions therefore contains 6,945 employees.

#### ***1.2 Job security equations***

The DMMO-EMMO database was matched with REPONSE 2004 establishments for the years 2000-2007. Once associations, charities and governmental organisations operating in the business sector as well as establishments with average net hourly wages in 2004 above 100€ are eliminated, this resulted in 2298 establishments that were matched at least once. Even if filling the DMMO-EMMO questionnaire is compulsory for all establishments with 50 or more employees and one fourth of the establishments with 10 to 49 employees, declarations are often incomplete. As a consequence, only 523 establishments were matched in all 32 available quarters. However, 1848 establishments were matched in at least half of the quarters, while only 178 establishments were matched in less than one fourth of the quarters. The average number of quarters with non-missing data per establishment is 23.7. The DMMO-EMMO database is composed of two datasets, one containing quarterly variables at the establishment level, including net employment growth and total number of movements (hirings plus separations), and another one containing information for each movement (that is, for each hiring or separation event). 6 establishment-by-quarter observations, for which the total number of movements in the two datasets were inconsistent, were also omitted from the sample.

For the subjective job security equations, the same filters as for the individual wage equations were used.

### **2. Main variables**

All variables come from REPONSE except when elsewhere specified.

#### ***2.1 Establishment-level variables as of year 2004***

**Ownership status:** Managers are asked: "What is the type of the main category of shareholder of the firm?" Possible answers are family/individual/French or foreign financial company/ French or foreign non-financial company/the State/the workers/others. We define a dummy variable for family ownership which takes value 1 if the main category of shareholder is either a family or an individual and 0 otherwise. The dummy variable for dispersed ownership takes value 1 if the main category of shareholder is either a French or foreign



financial or non-financial company and 0 otherwise. Similarly, we define 3 dummy variables for State ownership, workers' ownership and other shareholders which take value 1 when the main category of shareholder belongs to the relevant group and 0 otherwise.

**ICT use:** Managers are asked what proportion of the employees use computers, the Internet or the Intranet. For each of these new technologies, the answer is coded from 0 to 4 with 0 corresponding to "nobody", 1 to "less than 5%", 2 to "5-19%", 3 to "20 to 49%" and 4 to "50% and more". Our ICT variable is defined as the sum of the answers over the three types of technologies. It thus captures the intensity of use of ICT at the establishment level and varies between 0 and 12. We standardise it to 0 mean and 1 standard deviation.

**Innovative managerial practices:** Our index of innovative managerial practices is the weighted sum of the 8 composite variables below, most of which are directly inspired by Bloom and Van Reenen (2007). It initially ranges from 0 to 8.4 (with mean 5.3), and is standardised to 0 mean and 1 standard deviation

*Performance dialogue.* Composite variable scoring from 0 to 12. Sum of the 4 items below:

- Share of employees involved in quality circles: nobody = 0, less than 5% = 1, from 5 to 19% = 2, from 20 to 49% = 3, 50% and more = 4
- Share of employees involved in shopfloor meetings: nobody = 0, less than 5% = 1, from 5 to 19% = 2, from 20 to 49% = 3, 50% and more = 4
- Share of employees involved in expression groups: nobody = 0, less than 5% = 1, from 5 to 19% = 2, from 20 to 49% = 3, 50% and more = 4

*Workers' participation.* Composite variable scoring from 0 to 7. Sum of the 7 items below:

- firm project: no = 0, yes = 1
- seminars: no = 0, yes = 1
- firm newspaper: no = 0, yes = 1
- open day: no = 0, yes = 1
- suggestion box: no = 0, yes = 1
- satisfaction survey: no = 0, yes = 1
- quality action: no = 0, yes = 1

*Workers' autonomy.* Composite variable scoring from 0 to 2. Sum of the 2 items below:

- In case of incidents, workers are encouraged to refer to a supervisor = 0, to solve the problem themselves = 1
- work is defined : in terms of precise content = 0, in terms of goal to reach = 1

*Existence of targets.* Composite variable scoring from 0 to 6. Sum of the 6 items below:

Existence of quantitative targets in terms of:

- financial return: no = 0, yes = 1
- budget balance: no = 0, yes = 1
- labour cost: no = 0, yes = 1
- quality: no = 0, yes = 1
- growth: no = 0, yes = 1
- security: no = 0, yes = 1

*Managing human capital.* Dummy variable that takes value 1 if there exists a training scheme, 0 otherwise

*Rewarding high performance for managers.* Composite variable scoring from 0 to 3. Sum the 3 items below:

- Existence of a bonus (premium) based on individual performance: no = 0, yes = 1

- Existence of a bonus (premium) based on collective performance: no = 0, yes = 1
- Existence of stock options schemes: no = 0, yes = 1

*Rewarding high performance for non-managers.* Composite variable scoring from 0 to 3. Same components and scoring as for managers.

*Performance review.* Composite variable scoring from 0 to 4. Sum of the 2 items below:

- Individual assessment for managers : no = 0, for some of them = 1, for all = 2
- Individual assessment for non-managers : no = 0, for some of them = 1, for all = 2

*Consequence management.* Composite variable scoring from 0 to 4. Sum of the 2 items below:

- Impact of individual assessment on wages: no assessment or no impact = 0, indirect or long term impact = 1, direct impact = 2
- Impact of individual assessment on promotions: no assessment or no impact = 0, indirect or long term impact = 1, direct impact = 2

Our summary index of innovative managerial practices is the sum of the above composite variables, each variable being weighted by the inverse of its maximum score.

**Establishment size** is grouped into 6 categories: less than 50 workers, 50-99 workers, 100-199, 200-499, 500-999 and 1000 workers and above. We build a dummy variable for each size group which takes value 1 if the establishment belongs to that group and 0 otherwise. These dummy variables are used in our regressions. In Table A1, we present the average number of employee per establishment.

**Establishment age** is grouped into 5 categories: less than 5 years, 5 to 9 years, 10 to 19 years, 20 to 49 years and 50 years or more. We build a dummy variable for each age group which takes value 1 if the establishment belongs to that group and 0 otherwise.

**Occupational structure of the establishment:** proportion of workers in each of the following categories: managers, supervisors and technicians, clerks, blue-collars.

**Presence of union representative:** dummy variable equal to 1 if there is at least 1 union representative in the establishment.

**Share of fixed-term contracts:** proportion of workers on fixed-term contracts.

**Regions:** 10 macro-regions in which the establishment is located, resulting from aggregation of French administrative regions. We create a dummy variable for each of them.

**Industries:** detailed NAF codes are available in REPONSE. Using a standard map we aggregate them at the 4-digit level of the NACE rev. 1 classification. We then create a dummy variable for each of them.

**Average net hourly wages** include basic wages, and performance and non-performance related premiums and bonuses. They are net of employers and workers' social contributions but gross of income taxes. Source: DADS

**Listed on the stock market:** The information as to whether a firm is listed or not on the stock market is gathered from several sources: the REPONSE survey, Sraer and Thesmar (2007)

data, the Internet, the press and the DIANE dataset. We build a dummy variable equal to 1 if the establishment is part of a firm which is listed on the stock market.

**Value-added per employee:** in K€ - measured at the firm level and drawn from DIANE. In order to make it more suitable to be included in establishment-level regressions, the average value of this variable in the industry corresponding to the main activity of the firm (from DIANE) was subtracted and only the difference was used in establishment-level regressions. In practice, the underlying assumption is that if a firm has above average productivity, with respect to the industry average, all its establishments are likely to have above average productivity, even if their industry might sometime differ from the core industry of the firm. Of course, this treatment implies that this variable can be included only if industry dummies are included.

**Job creation rate:** ratio of the net growth of employment between the beginning and the end of a quarter to the average employment level during that quarter, if the former is positive. The average employment level during a quarter is computed as half of the sum of the employment levels at the beginning and the end of the quarter. Source: DMMO-EMMO.

**Job destruction rate:** ratio of the net growth of employment between the beginning and the end of a quarter to the average employment level during that quarter, if the former is negative. The average employment level during a quarter is computed as half of the sum of the employment levels at the beginning and the end of the quarter. Source: DMMO-EMMO.

**Separation rate:** for each type of separation, ratio of all movements during a quarter – excluding those corresponding to job spells equal of shorter than one month – to the average employment level during that quarter (see above). Correspondingly, the total separation rate is the ratio of all separations – whatever their type – during a quarter to the average employment level during that quarter. Source: DMMO-EMMO.

**Hiring rate:** ratio of all hires during a quarter to the average employment level of that quarter (see above). This ratio is obtained from the sum of separation and net employment growth rates, exploiting the identity for which net employment growth must be equal to hirings minus separations. Source: DMMO-EMMO.

## *2.2 Individual-level variables as of year 2004*

**Education** is grouped into 7 categories: no diploma, lower secondary education, lower technical education, high-school diploma, college degree, master degree, beyond master degree. We build a dummy variable for each educational group which takes value 1 if the worker belongs to that group and 0 otherwise.

**Occupations** are grouped into 4 groups: managers, supervisors and technicians, clerks, blue-collars. We build a dummy variable for each occupational group which takes value 1 if the worker belongs to that group and 0 otherwise.

**Full time worker:** dummy variable taking value 1 if the worker works full time, 0 otherwise.

**Age** is grouped into 10 categories: 16 to 20 years old, 21 to 25, 26 to 30, 31 to 35, 36 to 40, 41 to 45, 46 to 50, 51 to 55, 56 to 60, 61 and above. We build a dummy variable for each age group which takes value 1 if the worker belongs to that group and 0 otherwise. Workers in the

youngest and oldest age categories are excluded from our sample. Table A1 reports the average age of the workers.

**Tenure** is grouped into 4 categories: 0 to 2 years, 3 to 5 years, 6 to 10 years, more than 10 years. We build a dummy variable for each tenure group which takes value 1 if the worker belongs to that group and 0 otherwise. Table A1 reports the average tenure of the workers in our sample.

**Net hourly wages** include basic wages, and performance and non-performance related premiums and bonuses. They are net of employers and workers' social contributions but gross of income taxes. Source: DADS.

**Risk of dismissal:** Workers are asked: "In the next 12 months, do you feel that the risk that you loose your job is: very high/high/low/zero?" We build a variable equal to 1 if the perceived risk is zero, 2 if it is low, 3 if it is high and 4 if it is very high.

**Sensitivity to dismissals:** Workers are asked two different questions: "Does the risk of loosing your job push you to invest in your work?" and "Does job insecurity prevent you from investing in your work?" We build one variable corresponding to each question and taking value 1 if the answer is "not at all", 2 if it is "not really", 3 if it is "yes a little" and 4 if it is "yes a lot".

### ***2.3 Establishment-level variables as of year 1998 or between 1998 and 2004***

All variables dated 1998 are defined at the firm rather than at the establishment level. They are all defined in the same way as for establishments except the following variables.

**Change to family ownership between 1998 and 2004** is defined as family ownership in 2004 minus family ownership in 1998. This variable may thus take values 0 (no change in ownership), +1 (family-owned in 2004 while it was not in 1998) and -1 (family-owned in 1998 while not anymore in 2004).

**Annual gross wage per employee:** it is computed as the ratio of the firm's gross wage bill to the total number of employees. Computed for 1998 and 2004 from DIANE.

**Firm size:** number of employees in the firm. Source: DIANE.

**Establishment age** is grouped into 5 categories: less than 5 years, 5 to 9 years, 10 to 19 years, 20 to 49 years and 50 years or more. We build a dummy variable for each age group which takes value 1 if the establishment belongs to that group and 0 otherwise. The variable is obtained as a difference between the current year and the date of incorporation, obtained from DIANE. Whenever the computed age turns out to be smaller than that of the establishment, the establishment age is used instead.

### ***2.4 Industry-level variable***

**Industry-level firm turnover:** Firm turnover is defined as the sum of the employment weighted rates of entry and exit of firms in each industry in 1996. Rates are computed by

dividing this sum by total industry employment, using the OECD Firm-level Database, which provides information on entry and exit at the 2-digit industry level.